

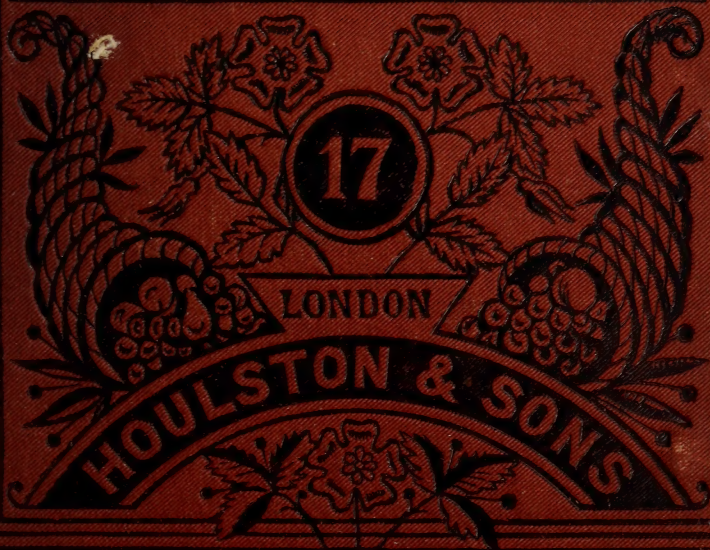
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THE
GARDENER



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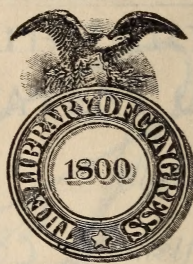
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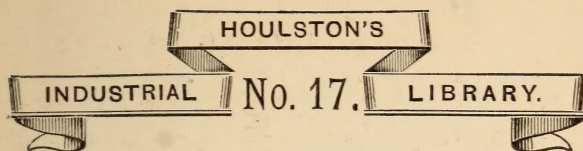
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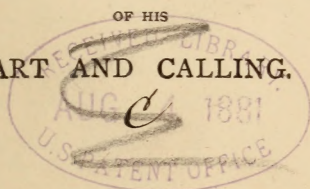
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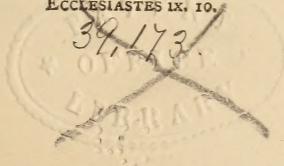
A SYNOPSIS OF
THE PRINCIPLES AND PRACTICE

OF HIS
ART AND CALLING.



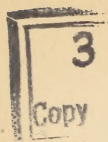
"Whatsoever thy hand findeth to do, do it with thy might."

ECCLESIASTES ix. 10.



LONDON:
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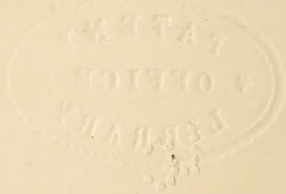


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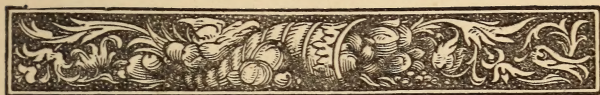
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P R E F A C E.

IN arranging the following treatise on the principles and practice of the art of Gardening, the writer has been principally guided by some of the works of Professor Lindley and Mr. Loudon, and his object has been to afford instruction to the professional and therefore practical Gardener—who conducts his operations with an eye to the market, and labours to render his garden productive to the utmost,—and also to the amateur, who takes innocent and useful pride in exhibiting the offsprings of his care and enthusiasm. The former cannot, it is true, devote much of his time to those subjects which are purely theoretical and not immediately remunerative, yet both ought to understand the *principles* of their art, as well as the practice of it, if they desire to attain any degree of pre-eminence. It has therefore been sought to accommodate the observations that are made to each of these classes, and to exhibit the routine of gardening operations from month to month, and the mode and manner

of performing all such operations in such a manner that, while enough is said on the science of gardening in its more advanced stages to render the book thoroughly useful to any man who can no longer be regarded as a novice in his calling, care has been taken to give a full and clear description of what may be termed the elements of the art, a knowledge of which is indispensable to all beginners who are about to enter on gardening, either as a profitable occupation or an agreeable and elevating amusement.

It may be further observed that the book, as giving a description of the duties of the Gardener, will prove useful, on the one hand, in helping a youth who is about to choose his future occupation in life to decide whether or not gardening appears to be a calling suitable for him, and one which he could follow up with interest and perseverance; and on the other, to remind those who have decided on taking up the vocation of a gardener, of what they have to do from day to day, and how it may best be done.



THE GARDENER.

CHAPTER I.

GENERAL OBSERVATIONS, ILLUSTRATIVE OF THE PRINCIPLES OF GARDENING.

WITH respect to the qualifications necessary to the Gardener, I assume, first, that every man who is to become one can read and write, for it will be necessary that he should consult books and reports, and keep notes. He will also find it his advantage to study Vegetable Physiology, the nature of plants, their proper food and appropriate soil, and to acquire such knowledge of their peculiarities as will enable him to give them proper treatment.

The nature of my subject requires that I should generalize somewhat, and enter a little into the Theory of Gardening, before proceeding with its details.

Vegetable Physiology is a delightful science, which, while it tends to expand the mind, and make one think of the wonderful works of God, is not in itself a subject of great difficulty. It is a legible page in the book of nature, which a man of ordinary powers may read as he walks in his garden, if he has had some elementary instructions respecting the principles relating to vegetable life. He sees indeed by his own observations, without the aid of books or philosophy, that plants germinate, breathe, receive nourishment, and perspire; that they have vital functions, though

very dissimilar from those of animals, and exist by very different laws. He observes the progress of vegetation from the time that the embryo of a grain of seed first bursts into life, pushes its roots downwards in search of the nourishment which earth affords, and its stem upwards for the air and light which are equally essential to its existence and development. He sees too that moderate moisture and heat are necessary agents in producing germination, though the philosophic causes which render their agency indispensable be unknown to him. He examines the roots, which, from the first stage of life, convey sustenance from the earth to the plant; and he perceives that the tender fibres stretch out more or less in search of the gaseous and fluid substances which their spongy extremities absorb and convey to the body of which they are such important functionaries. Experience tells him, in proportion as he becomes familiar with the respective natures of plants, in what degree and manner he must supply the earth and manure from which those roots extract the needful sustenance. He perceives that some plants have larger and more numerous leaves than others, and he learns that such derive considerable support from the atmosphere, which they inhale through their various and almost invisible pores. He knows also practically, that some of those require much moisture, while others can thrive in a comparatively dry atmosphere; but he rarely understands the organic distinction, which is, that the pores or stomates are more numerous and larger in plants designed for moist situations, for the purpose of enabling them to imbibe liquid more abundantly, and that these pores are far less numerous and active under contrary circumstances: for instance, the field turnip, particularly of the globe kind, requires a humid atmosphere; its very porous leaves cover the surface of a field in England, and produce their corresponding ef-

fects in the enlargement of the bulb; but in a drier climate, such as that of France, the same turnip does not succeed. It depends much on the action of its leaves, which in very dry air exhale more moisture than a limited supply of moisture can replace; they then become constricted, and consequently the growth and succulence of the whole plant become injuriously affected.

Experience teaches us that *heat* combined with *moisture* causes the greatest vegetation; as for example, at Guiana, where the sun is always extremely powerful, and the air humid. Though a moist atmosphere of from 48° to 50° is sufficient for most plants, the great family of them have a nature and habits adapted to a temperature from 75° to 85° ; or even 100° by sun heat. When we see vegetation failing from excessive heat, it is because the moisture of the earth, or the air, or of both, is insufficient. It is on our knowledge of this that the theory of *watering* depends; and in an analogous way we learn by our familiarity with other general principles of vegetable physiology, how to exercise practical modes of treatment with the utmost probabilities of success; whereas otherwise we should be in the dark as to certain operations of practice until *experience* had warranted their adoption, and in many cases valuable plants would be lost before this experience could be possessed.

Professor Lindley, in his delightful work on the Theory of Horticulture, remarks, that by examining the structure of a leaf through a microscope, the natural habits of unknown plants may be ascertained with sufficient accuracy. If they be provided with thick *epidermis* (or outer covering), with only a few pores, they ought to inhabit situations where the air is dry, and but little liquid nourishment can be obtained. On the other hand, if their leaves are pierced with numerous and large *stomates* (pores), these

plants properly belong to a moist climate. Plants whose leaves have an intermediate structure, will answer for positions in which nourishment is derived from the earth and air in intermediate degrees.

But more however, the Professor continues to observe, depends upon the relative size of the stomates than on their number in researches of this kind; these organs, though in many plants very numerous, are so small as to appear incapable of more than very limited action; while in others in which they are fewer, they are large, and endowed with activity. He gives remarkable illustrations of this. On a square inch of the *Crinum amabile* there are about forty thousand stomates, forty-five thousand on an equal surface of the *Aloe*, and seventy thousand in the *Mesembryanthemum*. The first of these is a native of the humid parts of India, and the two others grow on the arid rocks of the Cape of Good Hope; but the stomates of the *Crinum amabile* are amongst the largest of those in any known plants; in the other two the stomates are amongst the smallest that have been observed; and it is computed that the seventy thousand stomates of the *Mesembryanthemum* are not equal in power to ten thousand of the *Crinum*. Thus also the *Yucca aloëfolia* has four times as many of these parts as a particular variety of the *Cotyledon*; but in the latter they are $\frac{1}{750}$ th of an inch in their longest diameter, and are large and active; while those of the *Yucca* have only $\frac{1}{2500}$ th of an inch at the greatest extension, and appear comparatively inefficient. The *Yucca*, therefore, notwithstanding the vast number of pores in its leaves, possesses less evaporating power than the *Cotyledon*.

According to the same writer, the leaf performs functions analogous to those which the lungs and stomach discharge in animals; it contains the veinous system also, and performs an important part in elabo-

rating the sap, which, ascending in a crude state, is exposed to the action of *light* and air in the leaves. Important changes are in consequence effected as regards the nature of the sap; and it is then, in its altered state, thrown into a different system of vessels, by means of which it descends, prepared to add to the organization and development of the plant. In some plants the office of the leaves is performed by the rind and epidermis.

However obvious it must be to any observer of vegetation, that light and air are indispensable to the growth of plants, there are particulars respecting those elements of vegetable life which must be pointed out to the uninstructed mind. For instance, seeds will germinate perfectly in the dark, but the plants arising from them would soon decay if long deprived of light, which, though its influence on vegetation is unquestioned, acts in a manner that is mysterious and unexplained. The same great influence causes the colours of flowers, imparts their perfumes, and gives flavour to their fruits; yet some plants avoid direct light, and, though they cannot exist in darkness, flourish only in the shade.

Many seeds and buds do not succeed except under a north aspect. Such is the bountiful provision of Providence in organizing plants for every clime and situation; and is not the study of those peculiarities of structure in vegetables and of their habits most interesting to the inquirer, even though for common practice he may dispense with it?

Then again as to the influence of *air*, which, after moisture, heat, and light, is the most important agent in forwarding vegetation, there are facts, however plain they may appear, which are subjects of admiration and study. Air, that affects the animal frame so powerfully, has a corresponding effect on every blade that grows. It contributes with light to produce

colour and flavour, and by its gaseous fluids imparts nourishment and vigour. Stagnant air, so prejudicial to the human frame, is also unhealthful to plants in full vegetation. Yet moist air charged with electric matter, so oppressive to animals, gives increased activity to plants; and dry air, so good generally for the former, is injurious to the growth of the latter; and putrid exhalations which are fatal to mankind, become the means of supporting the vegetable world, which is made to consume the substance which otherwise would be noxious to us.

Surely in the consideration of such matters there is pleasure and profit; yet though the functions of plants may be understood in their general principles, there are many points little, if at all known, which relate to their food. For instance, the application of an apparently inert substance, such as gypsum, (plaster of Paris,) promotes the growth of certain plants, and yet the manner in which it acts, the *modus operandi*, as it is termed, is not understood. The poorest sand or brick-dust, which possesses no nutritive qualities, if scattered on grass land causes very perceptible effects, and produces white clover where it had not previously appeared; but who can explain the nature of the influences which produce the vegetation?

As to *soils*, it is not enough to be aware that a loamy and deep mellow soil, free from stones, is the most desirable; that an intractable argillaceous clay, being too retentive of moisture, is unfit for a garden; and that a very sandy soil, from the contrary defect, is unfavourable. The Gardener should be able to distinguish the degrees in which there is an excess or deficiency of any component parts, to know the means of remedy, and the proper adaptation of his plants to his soil, of whatever kind it may be. He may judge correctly by his senses, that dark-coloured earth is generally the best; yet it may be too light and loose

in its texture, too much approaching the nature of peat. In short, he must study the nature of earths and fertilizing substances, because on their proper combinations the success of plants depends.

I obtained from a chemist the analysis of a peculiarly fertile sand in my present neighbourhood, which, when mixed in moderate quantities with the scourings of ditches and fresh turf, forms, with animal manure, an admirable compost for most common vegetables. The following are the substances :—Chlorine, sulphuric, carbonic, and phosphoric acid, sodium, soda (oxide of sodium), potassium, potass (oxide of potassium), magnesium, magnesia (oxide of magnesium), lime, iron, oxide of iron, peroxide of manganese, lead, sulphur, silex, alumina, oxide of manganese.

I merely mention this as illustrative of the fact, that various elementary substances enter into the composition of soil. There is also a most important secondary substance called Humus, the most fertile of all matter, created by the decomposition of animal and vegetable substances. Soil which has seven per cent. of this matter is considered very rich, and if even less than half that quantity be present in a good loam, the gardener may be very well satisfied for ordinary purposes. Humus, though consumed by plants in the progress of growth, becomes, by the beneficent provisions of the Creator, continually reproduced by the decay of the matter which yields it. It may easily be known by its appearance when separated from all other earthy matter : it is dark-coloured, brittle, and carbonaceous, and will not dissolve in water until exposed for some time to the action of the atmosphere. The value of this dark-coloured, yet light and elastic substance arises from its porousness, and the great quantity of carbonic acid which it contains ; and whilst it acts as a manure to the soil, it renders it more pervious to moisture, more accessible to atmospheric

influences, and free for the action of the roots of plants.

A *rich loam* is the best for ninety-nine out of a hundred of all trees, field and open garden vegetables.

Calcareous earth has for its base carbonate of lime, combined with argil and sand in different proportions. A soil of this kind, in which the calcareous particles are minutely blended with the clay, gives free passage to the tenderest fibres, retains moisture sufficiently, and becomes friable when dry.

Sandy or Siliceous Soil is that in which silex or sand abounds. This is so deficient in cohesiveness, that it cannot retain moisture, and is unable to support any vigorous vegetation; although suitable to some plants, as will appear, and very useful by its mechanical effects in correcting the defects of strong land, yet it is not that which the gardener should choose.

That dark-coloured *Vegetable earth*, of light substance, abounding in Humus, and based on freestone, which is on many of our heaths, is the best for many choice and delicate flower plants, because a long time elapses before all the vegetable matter it contains is reduced to humus; and during that long-continued process of decomposition, the carbon which is disengaged is constantly yielding nourishment, and combinations favourable to vegetation are unceasingly taking place. But the gardener has to look to his general purposes, and a soil wholly of this kind would not be desirable to him.

Generally speaking, the excellence of soils is tested by their specific gravity; but for many plants a light soil is the best, as will appear in the course of my observations.

Aluminous or Argillaceous Soil, which is composed principally of *Argil* and *Silex*, the former always in excess, constituting a stiff clay, is the very worst that a gardener can meet; for it is so tenacious, that it will not

permit moisture to penetrate without difficulty through it, nor part with it as other soils will; it is therefore cold in winter and hard in dry weather, bursting into fissures, so as to cause injury to the plants, whose roots become, in consequence, affected by wind and drought; in that state it is impenetrable to the tender fibres. Intermixture of sand and other loosening substances, with abundance of manure, and thorough draining, will greatly alter the nature of this soil; but it will never become good for a garden. Yet argil (or clay) is sometimes combined with so much sand, as to form an excellent basis. The late Rev. W. L. Rham found by analysis that a rich garden mould contained—

Clay	-	-	52.4
Siliceous sand	-		36.5
Calcareous sand			1.8
Carbonate of lime			2.0
Humus	-	-	7.3

in 100 parts; and that it had a specific gravity of 2.332, that is to say, a gallon of it weighed rather more than $2\frac{3}{10}$ gallons of water. According to the same excellent authority, a medium soil had a specific gravity of 2.401; and a poor soil 2.526, being in the proportion to an equal bulk of water, as $2\frac{1}{2}$ to 1, nearly. The latter description of soil contained a large proportion of siliceous sand, and wherever this is in excess, it renders the soil so deficient in cohesiveness, that it does not retain moisture.

With the simple apparatus described in Mr. Rham's Essay, any intelligent man may ascertain the component parts of a soil, and detect adulterations in the substances which are sold as guano, bone-dust, &c.; the necessity for this has been proved in a remarkable manner recently; a quantity of the former having been found by analysis to contain thirty per cent. of sand, and thirty per cent. of water.

With the elements of *Botany*, at least, any man presuming to call himself a gardener must be acquainted, else he will make great mistakes in answering the demands which may be made upon him for seeds and plants, and will not know how to distinguish certain varieties in forming his own collections. It is not very difficult to acquire at least such practical acquaintance with botany, as will enable one to know, that in the generality of plants, every flower consists of an external formation called the *calyx*, which with some exceptions is green in colour, and more or less divided, such divisions being called *sepals*; the *corolla*, in general the most conspicuous and beautiful part, is seen next to the calyx, and is either entire, or composed of several, sometimes a vast number of leaves, called *petals*; next within these are situated the *stamens*; and the *pistils* occupy the central part. Moreover, that the stamens are the male parts of the flower and the pistils the female; the latter being connected at their base with the *receptacle* containing the seeds. In the greater number of plants, every flower contains both these male and female parts; whilst there are cases in which they occur only in different flowers or even on different plants. A knowledge of these and of all the other beautiful arrangements for the multiplication of plants by seed, may be easily acquired by a little attention.

Without some knowledge of this science, the gardener will be incapable of conducting his business in a perfect manner, and will not even know why some plants are propagated by the bulbs and not by the seed, and why some flowers are fertile and others barren, and how the hybrid productions arise.

The late Mr. Loudon, who had a most extensive acquaintance with gardeners, gave it as the result of his experience, that there is scarcely a science or an art which some master gardener of his acquaintance had not of his own accord taken up and studied from books, so as to obtain a respectable degree of know-

ledge of it. A number have taught themselves several languages, and many excel in almost every department of mathematics and geometry. Some are scientific meteorologists, naturalists in all the departments, and a number are good draughtsmen. Many Scotch gardeners dip into metaphysics. "The development of so much talent among gardeners, is no doubt owing to the nature of their profession, which excites thought; to the isolation of their dwellings, and the necessity of their staying at home in the evenings to look after the hot-house fires; and very much also to the kind indulgence of their masters, who, with very few exceptions, allow them the use of whatever books they want from their libraries." Then, after showing how much the scientific periodicals on Horticulture, which have issued from the press within the last quarter of a century, have tended to excite the talent of writing among amateurs and practical men, he concludes with the very just observation, that "notwithstanding all their intellectual progress, gardeners still maintain their modesty of deportment, and that high moral character, which commands the respect of their employers and of all who know them."

CHAPTER II.

GENERAL DIRECTIONS, AND GARDEN REQUISITES.

The sciences which the gardener who is master of his art must cultivate, and Horticulture itself, tend indeed in a high degree to elevate his character both intellectually and morally. There is nothing mean or sordid in his everyday pursuits. The book of nature is before him, and he reads some of its most delightful pages. Can he be uninfluenced by the pure and exalted subject of his contemplations? Even the humble

garden assistant or labourer has his professional pleasures in the occupations and pursuits of the garden, according to his attainments. He may assure himself too for his comfort that he is a very useful character, and, as Mr. Loudon truly says, often more valuable to the amateur who is his own head gardener, than a professional gardener, whose superior knowledge and skill might discourage him in his operations.

The following rules are worth attending to:— Have a place for everything, and put everything into its place; let the tools be collected in their proper shed, always at hand, without loss of time in searching for them; the seeds papered and labelled in their appropriate drawers; memorandum and account books carefully noted and indexed, keys on their own nails, dried fruits and roots neatly arranged on their floors and shelves, and empty flower-pots put together in sizes; for nothing is more unsightly than the appearance of things straggling about the walks and borders, nor more annoying to an orderly person than irregularity in such particulars.

If you are obliged to leave any work unfinished, do not lay your spade, rake, &c., in the way, and when you have done using the garden line, wind it up, and lay it aside at once. From slovenliness in this respect, and the careless habit of leaving the line out in wet weather when work is broken off, it is soon destroyed.

Always finish what you have commenced, if you can; do not, for instance, leave the same drill half formed or half covered, or any seeds exposed. Suppose you are planting cabbages or cauliflowers; fix them firmly at once, not leaving to a succeeding hour or day what ought to be done without interruption or delay. Perform each work in its proper course as much as possible, and save all unnecessary labour by completing what has been taken in hand. Suppose, for example, you have been hoeing weeds from plats

or borders, or clearing them from rubbish or incumbrances, such as pea-stakes, or anything else that may be in the way,—clear them off entirely before you leave that particular work which you have begun, else you may have additional trouble. Weeds, if thrown on the walks, may take root before their removal, and dirt is accumulated by all such mismanagement, besides the objection on the score of unsightliness of litter on the walks; throw weeds and rubbish, therefore, at once into a wheelbarrow or basket, and remove them.

For the same reasons, when you are cutting cabbages, cauliflowers, or pulling turnips, carrots, parsnips, &c. for kitchen use, take them away leaves, roots, and all, unless in the case of cabbages when sprouts may be desired, and remove the refuse to the proper receptacle for it. By this means you will leave the ground in a free and cleanly state, and get rid of many worms and insects in the rotting heap, by quick lime or salt.

Endeavour to be rather in advance as to seasons and work than the contrary, to avoid confusion and hurry. You may safely anticipate time a little, in forming or turning composts, trenching, weeding, &c. It is a great matter to get on with such labour, so as to have full leisure for other operations.

While you endeavour to preserve order and neatness in all your garden departments, do not neglect attention to personal cleanliness. The sweetest odours of the flowers which surround you will not render you the less offensive to your master and the ladies who may frequent the greenhouse, if soap and water and clean linen be too sparingly applied to your person. Uncleanliness and slovenliness are always avoided by those who have a becoming degree of self-respect, and a desire of pleasing.

The British Gardener comes frequently into the immediate presence of the fairest, the most elegant, and

the most lovely specimens of womankind that the world produces; he ought, therefore, to be especially sensible of the high privilege he enjoys, and therefore most attentive to the neatness of his person and attire. His dress however should be very plain and unpretending, and of such form as will not incommode him in passing between flower-beds and choice shrubs.

This reminds me of a woman whom I know in France, who for forty years has worn trowsers instead of petticoats, from having been led to adopt them in her youth, when she was generally occupied in weeding flower-beds. The gentleman who employed her, one day remarking that her petticoats brushed his tulips rather rudely, said jokingly, "I wish Jeaneton you would wear a pair of my trowsers instead of those troublesome petticoats." The girl, who was then about twelve years old, replied, that she had no objection to do so. From that time she has invariably worn trowsers (as also a man's short frock shirt), having found them more convenient for weeding in a garden, and all the purposes of the life of labour which she has pursued, than the more correct garments of her sex. I do not, however, mention this peculiarity from any expectation or wish that my country-women should imitate the example of Jeaneton Culottes in this respect, but as a general hint, that long-tailed dresses, for either sex, are unsuited to garden work.

Situation and General Arrangement of a Garden.

Some preliminary remarks respecting the situation and general arrangement of a garden must now be offered. A man cannot often choose the exact site which he desires for it, no more than he can fix the quality of its soil: he must generally take it as he finds it, and he will not hastily break up an old-established one, because it may have some deficiencies, though gardens are sometimes so injudiciously placed,

that it would be less expensive to change their position than to persevere in the culture of them ; but in forming a new garden, he should exercise sound judgment in the selection of its locality. A low and sheltered situation, but not so low as to be without sufficient inclination for discharging superfluous moisture, with a southern aspect, is evidently the most desirable position, but it is a mistake to suppose that a low situation is always the *warmest* ; no doubt the shelter which it possesses from parching and destroying winds is greatly in its favour, but as far as mere warmth of temperature is concerned, such a situation does not command it, because, since cold air is heavier than warm, the atmosphere nearest the earth will be cooler than that which is higher : if then a garden is in a flat in a valley, the cold air rests there—besides, the cold air which issues from the sides of the hills falls into the valley, so that what are by a common error supposed to be warm situations, are in spring and autumn the coldest. It is for this reason that potatoes, kidney beans, and dahlias, are destroyed by frosts in autumn in the valley of the Thames, while the same vegetables are uninjured on the low hills of Surrey and Middlesex at the same season.

Professor Lindley found that one thermometer stood in the same night thirty degrees higher on a slight eminence, than the other did in the vale, from which he infers, that a garden should be on a gentle slope ; and he points out the advantage of having a stream of running water at the bottom of the garden, to prevent any injurious stagnation of air. Shelter from the north and north-east wind, which are the most destructive, must also be a principal object. If there be no natural shelter from those points, very hardy evergreens should be planted outside the walls or other fences, but not too near ; while every tree or other obstacle to the free access of the sun's rays on the south side should be, if pos-

sible, removed. Evergreens make the best shelter, inasmuch as they are equally efficient both in summer and winter; but as they do not grow so rapidly as some other trees, and as immediate shelter is required when a garden is formed, a row of poplars may be planted outside the evergreens; for even in winter their twigs will obstruct the sweep of the winds. Forest trees should never be planted very near the outside walls, else their roots may penetrate underneath the walls into the borders within, and rob the fruit trees and other productions of their proper nourishment; the droppings from the overhanging leaves of the ash, in particular, are highly injurious. The form ought to be such as will present the greatest portion of area and of wall or hedge to the sun, and least to the north and west. Where there is no better boundary than a hedge, espalier and standard fruit trees, and vegetables generally, may be raised freely on its sunny side; and therefore the greatest possible extent of ground should be included on that quarter. The north wall ought to be at least twelve feet high, for it is a wasteful economy to curtail the elevation at the loss of the valuable fruit with which it might be covered to the summit; and as dishonest neighbours are sometimes met with, the saving of fruit and choice vegetables from the hand of the spoliator, by a secure fence around the garden, may in a few years be more than a counterbalance of two or three feet of mason-work in the height of a wall, which, if of stone, can be diminished in breadth to a single foot above. Moreover, a high wall with a southern aspect becomes much more heated than a low one; and a higher temperature is maintained for the trees in front, the roots of which are likewise benefited from additional heat acquired by the border from greater reverberation of the sun's rays. But unless a protection from spoliation, or that its external side can be rendered available for

fruit trees, the wall at the south side of the garden requires but little elevation. And next, that with a western aspect. A coping of about four inches is generally added, to save the blossoms from the beating down of perpendicular rains. But a moveable coping of boards nine inches in width, made to fit below the permanent coping, and to slope a little downwards, is of great use in spring for protecting the blossoms. The radiation of heat is prevented, and consequently frosts, if not very severe, do not injure the vegetation beneath such. When all danger of frost is over they should be removed, as the foliage is fresher and less subject to insects where it receives the dews. A garden wall which has its interior to the north, may be rendered available for the support of fruit trees on the outer side, by enclosing with a stout thorn hedge a strip of garden, which, from its exposure to the sun and shelter from the north by means of the hedge, will be very useful for strawberries, and various early and choice productions: if the hedge be planted when the fruit trees are put down, and carefully preserved, it will become a sufficient outer guard by the time that they will have arrived at full bearing. To the disgrace of our country, thieves break through and steal from walled-in gardens; while in France, and other parts of the continent, the choicest fruits display their luscious treasures in the most exposed places, even in populous towns, without loss to the owners.

Every well-appointed garden ought to be provided with a reserved spot for hot-beds, composts, weeds, and every thing that offends the eye of taste, and if a small area be enclosed with close-wooded evergreen trees, such as the *Arbor vitæ*, in the hedge form, it will be found most useful for sheltering greenhouse plants from too much sun in summer, and from wind at all times.

Brick walls absorb more heat than stone walls, and

of course are warmer for the vegetation in front. If stone be the material used, it is necessary to have a trellis work attached for the proper training of peaches and nectarines. The trellis ought to be as close to the wall as possible; for if it project much, the trees will receive less benefit from the heat reflected by the wall through the day, as well as that which is absorbed during the latter period and given out by radiation at night. The inconvenience of training over an irregular surface, or where the joints are widely apart, is however best obviated by having the walls of brick. Cross brick walls are very desirable for peaches and other delicate fruits on the south side, while the opposite may serve for inferior fruit trees, and for retarding the growth of vegetables, which is often found necessary. Espaliers are very useful for the growth of apples and pears, as they admit of much economy of space. It is of little use attempting to grow the finer dessert cherries as standards, from the impossibility of protecting the fruit from birds; but grown as espaliers the trees can be netted over.

The selections of the sorts to be put down in your newly-formed garden, must depend not only on aspect, and such accommodations as I have stated, but also on the nature of the soil, which is of much influence in determining the appropriate selections. The celebrated Chaumontel pear, which, under the favourable combinations of a mellow soil and a warm moist climate, is so soft and luscious, and of such an enormous size in Jersey, becomes hard and bitter in any strong land; and at no greater distance than twenty-five or thirty miles on the coast of Normandy, and in apparently suitable soil, it loses its high flavour and size so much, that it would not bring half the price of the Jersey Chaumontel in London.

The gardener, who is but little acquainted with such particulars in theory, may imagine that he has only to

plant in his garden the same kind of fruit trees that he sees productive in his neighbourhood, though aspect and soil, or either, may be different, and a very slight difference in these respects will produce great effects on fruit. The warmest situations ought to be assigned to nectarines, peaches, and apricots, and to the choicest winter pears; though pears may do well on espaliers, or even as standards, they will be produced of larger size against a wall, where the blossoms can be protected from late spring frosts, and the fruit comparatively safe from being blown down prematurely by high winds. The aspect, however, ought to be good, otherwise the flavour will prove inferior to the smaller and less handsome specimens of the same variety, produced on standards or espaliers.

When you have the sun only during the third or fourth part of the day, plant plums and inferior pears. Both plums and apples are hardy fruits, and accommodate themselves much more readily than the others to soil and aspect, but unless the cherry tree have a warm aspect and a loose soil, it will not succeed well.

The extent of accommodation as to stovehouse, conservatory, &c., necessary in a complete garden, must depend on the scale of operations, and the circumstances of the proprietor. A gardener who cultivates for sale will require more glass and more space in every way than a private individual, who does not desire to multiply his sorts, whose object is merely to have a few specimens of the most admired kinds, and to whom a superfluity of any varieties would be inconvenient, unless for the purpose of making exchanges with other *amateurs*, for mutual convenience. The salesman, on the contrary, desires no other limits to the multiplication of his sorts, than the extent of demand from his customers.

I am familiar with the economy of a small nursery

and garden, which furnish for sale very considerable quantities of choice plants, without greater means of raising and keeping them, than those which I am about to describe.

Under a portion of the north wall of the inclosure is a range of glass shed, fifty feet in length, ten clear feet in breadth, and twelve feet in height at the back part. This range is divided into compartments—a stovehouse and a greenhouse—the former being thirty feet long, the other twenty, and each communicating with the other by a door in a brick partition. At the extremity of the stovehouse, not adjacent to the second room, is a porch in range with the back wall, but not extending so far in front, not roofed with glass, but with slates, yet with a sufficiency of light through the glazed frames in front and a part of the side, and a sliding window in the roof, to render it useful for containing such plants as it may be occasionally desirable to keep in a cool and shaded place, to retard their period of flowering, or to preserve in bloom for a longer time than if they were in the interior; at the right hand side of the porch, under the slated roof, which in that part corresponds in slope and breadth with the range of glass roof, is the furnace, sunk in an inclosed pit, three feet below the level of the floor, the alleys of which, as the ground is very dry, are sunk below the level of the garden walk outside; a door to the furnace pit prevents the waste of fuel that would be occasioned by too great a draught of air.* The roof of the entire range is inclined at an angle of 45° , and rests on a transverse beam of the glazed frame in front, at no greater elevation from the ground

* I have seen a miniature limekiln very economically used for heating a hothouse, by being fixed next its rear wall in a farm yard; in this kiln were burnt four bushels of lime daily, through the means of the same furnace which heated the room.

than three feet; one foot of the front at the bottom is of brick. The remainder, composed of glass frames, rests on uprights inserted in the foundation wall, on which there is sufficient breadth inside for a row of pots.

I have noticed the exact inclination of the roof in this instance, because this point is a subject of discussion, some maintaining that a flat roof is of great importance, in order to have the sun's rays as perpendicular as possible in winter—a desideratum no doubt. Yet when we consider how few are the days during which the sun shines in our climate in that season, and how obliquely his rays fall upon us, the degree at which the reflecting glass may happen to be inclined, is not a very essential matter.

The tan-pit, which is the length of the stovehouse, is three and a half feet wide in the clear, and three deep, and inclosed by four-inch brick walls; along the side of this pit, next the front, is a passage two feet wide, with another at the interior side, a little wider; the upper side of which, though but four feet from the back wall, admits of six gradually rising steps or shelves for pots.

A knowledge of the nature and habits of the different exotics, can alone determine the gardener as to the temperature and treatment they should receive; he must, therefore, if deficient in the necessary information and inexperienced, consult those books which classify the plants, and minutely explain their peculiar temperaments. Generally speaking, a very temperate degree of heat is sufficient for the plants which are natives of countries from latitude twenty-five to thirty-five; but this rule is so far from universal, that if a gardener on ascertaining the latitudes of his plants, were to treat them accordingly as to temperature, he would sometimes find himself most egregiously in error; for instance, the *Heliotrope* of Peru in the torrid zone only requires a temperate heat,

while plants of the same latitude in Asia can only exist in the tan-pit of a hothouse.

The degrees of heat in the old and new continents, in the same latitudes, are very different.

Heat (by means of warm water) is conveyed to the tan-pit of the house I am noticing, by a pipe conducted through the tan, within a foot of the bottom, from the boiler and furnace outside; and if necessary, the air of the inner room can also be warmed by an extension of the tube; but the inner room is found to be sufficiently warmed, even in severe weather, by occasionally opening the door of communication, when the heat reflected from the glass during sunshine is insufficient. In that room are the Cape Heaths and Camellias, Fuchsias, Calceolarias, Cacti, New Holland plants, and others which do not require the stoveroom, or any that may have been too much drawn up there, or that have become mouldy from want of a free circulation of air.

There is also another shed on a still smaller scale in every respect for the tropical plants, which require a higher temperature, and therefore cannot be always associated with the hardier ones. In this detached room is a small tan-pit, extending along the front, for propagating and forcing the tropical plants, and with only one alley at the rear of it. In this, as well as in the other stovehouse, there are vines planted in the usual way, viz. about two feet and three feet distant from each other, outside the front walls, the stem being introduced to the interior through the walls and glass, and trained to the rafters above.

In order to enable him to propagate cuttings extensively, and to keep up a numerous stock of the same varieties, the nursery-man, to whom I am still alluding, has a great many garden frames of different sizes, most of which in the spring, and until the beginning of June, are filled with young plants in pots, or in the

hotbed earth; by being so near the glass as they are in these frames, they advance more rapidly than if they were in the houses; and receiving fresh air so readily, they are not in danger of being too much drawn up. He generally has a great number of Cacti under one of those frame glasses during the summer, but removes all the plants to their winter apartment at the end of September, as the rain and cold, which would inevitably gain admittance through the glass which has so little slope, would destroy them.

You will find it always expedient to have at least three sizes:—No. 1, small and moveable; No. 2, larger, with a fixed frame and moveable sashes; No. 3, high enough behind occasionally to contain tall plants, and large enough to admit many of the usual inmates of the greenhouse in the summer months, and any of them may serve as an infirmary for delicate plants that may require change of air and situation.

For many purposes pits enclosed by stone or brick walls are very convenient—a shallow frame can be placed over them to hold the sashes, running up and down in grooves; or seeds and plants which do not require glass, and yet need some covering in hard weather, may be easily protected within the enclosing walls with the assistance of a few stakes or rods, by any sort of covering thrown across from wall to wall.

For small seed beds with frames, coverings of oiled paper or calico* (waterproof) are often sufficient, and with such a simple auxiliary even a cottage gardener may raise vegetables which otherwise he could not bring forward at an earlier season, or perhaps at all.

* The following preparation will be found useful, viz.:—Three pints of old pale linseed oil, one ounce sugar of lead, four ounces white resin; the sugar of lead to be ground with a small quantity of the oil, then added to the remainder, and incorporated with the resin by a gentle heat. The mixture should be applied to the calico, when nailed to the frames, with a brush.

A moderately good contriver can do a great deal with very inexpensive apparatus.

A covering of flimsy material may appear very useless, but it is really most effective, and that it should be so is explained on the principle of the radiation of heat.

Without entering into all the philosophy of this, as clearly demonstrated by the late Professor Daniell, it is enough to state, that any shading substance interposed between the sun and a plant, or between the sun and a bed of earth, intercepts the heat, which radiates from it and sends it back again. A transparent covering, such as paper or calico, allows the sun's rays to pass through it, and yet, though very porous in texture, it tends greatly to give back the heat which arises from the earth, and which would otherwise be dissipated.

The increase of warmth which may be imparted to plants in winter by a coverlid of this kind is considerable. Even the branches of a tree overhanging a field will, in a bright starlight night, preserve the ground beneath, by radiating at a much higher temperature than where there is no such awning. If the branches could be brought nearer the ground, the temperature would be raised accordingly. "Almost all the modes in practice of *protecting plants* are founded on the doctrine of radiation; and hence the gardener should keep constantly in his mind the fact, that all bodies placed in a medium colder than themselves, are continually giving out their heat in straight lines, and that these straight lines, when the body is surrounded by air, may always be reflected back on the body from which they emanate by the slightest covering placed at a short distance from them; while on the other hand, if this slight covering is applied close to the body, instead of reflecting back the heat, it will carry it off by conduction: that is, the heat will pass through the thin covering closely applied, and be radiated from

its surface. Hence in covering sashes with mats, a great advantage is obtained by laying straw between the mats and the glass, or by any other means of keeping the mat a few inches above the frame. Hence also, when the branches of trees are to be protected by mats, they will be rendered much more efficient if first surrounded by straw, fern, or some other light body, which contains in its interstices a good deal of air. It should be borne in mind," Professor Daniell observes, "that the radiation is only transferred from the tree to the mat, and the cold of the latter will be conducted to the former in every point where it touches. Contact should therefore be prevented by hoops or other means properly applied, and the stratum of air which is inclosed will, by its low conducting power, effectually secure the plant. With their foliage thus protected, and the roots well covered with litter, many evergreens might doubtless be brought to survive the rigour of our winters, which are now confined to the greenhouse and conservatory."—*Horticultural Transactions*, vol. 6.

All frames should be so placed in the garden as to have the morning and the mid-day sun, and to allow room for going round them to open and shut the sashes, and apply linings when needed. A low sunk bed, facing the north east, is useful for Azaleas, Rhododendrons, and Kalmias, and some Heaths that love the shade, and for cuttings which strike better without exposure to the sun—nay, there are plants which do better with the northern aspect always.

Supposing that you find it requisite to plunge some plants that have suffered in their health elsewhere for revival, do not push them too much by heat, moisture, and confinement; for although such means may serve their appearance for a time, yet their health will be injured, as will be manifested after they are taken away by your customers, supposing you propagate for

the market. It will be more honest to strengthen the plants before you part with them, by plunging them into an old bed, and while they are thus acquiring strength, examine the bottoms of the pots occasionally, in order to see that the roots do not push through the holes, for though their roots would increase in size and vigour by liberation from confinement, the check given to them on their subsequent removal to the shelf of a greenhouse, would more than counterbalance the advantage of the previous vegetation, to your loss of credit, and the disappointment of the purchaser. You will find it useful to have reserved beds of rich soil, for rearing the most valuable nursery trees, fruit trees, and evergreens, whether for seedlings or cuttings, and a place for the dog roses and other stocks on which you bud or graft, alternating the productions in those beds as often as you can.

Some heaps of rich loam peat, composts of rotten leaves, &c., should always be provided in some convenient spot, and sunk beds, filled with heath mould to the depth of eighteen inches or two feet, and having an eastern aspect, will afford great facility for the propagation of those shrubs which thrive best in such soil.

Tools, Implements, and Instruments.

The number and varieties of these must be regulated by the size and description of the garden; some are indispensable on every scale of work and style of culture; others are more or less required, according to circumstances. Those that may be considered necessary are—

Shovels.

Hoes and scrapers of sorts.

Rakes ditto

Roller.

Trowel.

Dibber.

Hammer.

Pincers.

Knives of sorts, for pruning, budding, and grafting, and for cutting asparagus, &c.

Saw.

Hedge bill.

Shears of all sorts for chipping hedges and shearing turf in edging.

Hatchet.

Axe.

Scythe.

Watering pots.

Sieves.

Wheelbarrows.

Bell and Hand Glasses.

Garden line on an iron rod.

Ladders.

Labels.

Thermometer.

Pans, saucers, and pots. These last (pots) are distinguished by gardeners, and vary among the London potters, from No. 1, the first size, called Twos (two only being cast together), which is eighteen inches in diameter, twelve inches deep, to No. 11, which has eighty in the cast and is called Eighties (or Thumbs), one inch and a half in diameter and two inches deep. Matting of tall reed straw, either of single or double lengths (for by uniting the upper ends in the centre nearly twice the height can be obtained), tied together in sufficient thickness, within a foot of the top and bottom, and at the centre, has the advantage of being lighter than bast mat, and far more easily made. With care it will last two or three years. Oiled calico for occasional awning in summer will also be a requisite.

CHAPTER III.

OPERATIONS OF GARDENING.

Having premised these particulars, I shall proceed to consider the theories on which some of the leading *operations* of gardening are founded, and to furnish some details of practice to illustrate my position.

Plants are propagated and increased naturally by their seeds, and artificially by budding, grafting, layering, cuttings, slips, &c.; and of those different modes of multiplying, some are peculiarly applicable to certain classes of plants; and though propagation, by a great law of Providence, is most frequent through seed, the artificial means are in numerous instances far preferable, from the habits of the plants themselves, as well as from the gain thus obtained in the maturing of them. All very short-lived plants, however, evidently form exceptions to the propriety of employing this mode.

With respect to seed-sowing, the quantity of earth with which grains should be covered ought to be exactly proportioned to the size and nature of the grain. Experiments have proved that grains of wheat, which is by many farmers supposed to require a heavy layer of earth, may be successfully grown without any covering of earth at all; the roots being established in soil of firm consistency, the stalk rises vigorously in the air; yet all seed that is not of purely aquatic plants must have the earth for its nurse, more or less, after it has germinated, which may be effected without any external influences except those of the atmosphere.

A very light covering of earth, however, is generally sufficient, varying with seasons and the quality

of the earth. It is said as a standard of density, that this need not exceed the bulk of the individual grain; but much more may generally be applied, if it were only from the necessity of guarding against the attacks of birds. For small seeds the earth ought to be very fine, and for some sorts sand or peat mould lightly scattered over them is the only covering they can bear, without the young plant suffering in its ascent from the loss of light and heat.* Other grains, on the contrary, can support a heavy coat of argillaceous earth without inconvenience. Experience must be your guide in these particulars.

But seed is in numerous cases unfertile altogether: the finest varieties of fruits, all the double flowers so prized, are more frequently sterile than fertile from the following causes—viz. the absorption by some near member of the plant of organic matter which is essential to the perfection of the grain. Sometimes portions of the plant distant from its fruit are so constructed, that they attract to themselves the nourishment destined for the fruit, and thus present an obstacle to the development of seed. The early varieties of the potatoe, for example, cannot easily yield seed, because their tubers absorb the nutritive matter necessary for the development of the seed. Some of the most delicate varieties of the pear seldom produce seed from this probable cause, according to Professor Lindley.

* “As far as general rules can be given on such a subject, it may be laid down, that the temperature of the earth most favourable for germination, is from fifty to fifty-five degrees for seeds of cold countries, from sixty to sixty-five degrees for those of plants requiring moderate stove-heat, and from seventy to eighty degrees for those of the torrid zone.”—*Professor Lindley*. By boiling seeds, those of the *Acacia Lophanta* for instance, the germination may be assisted partly, as the Professor observes, by the mechanical effect of the heat, in causing the shells to burst, and partly by dissolving and stimulating the substances they contain.

Too much luxuriance in the plant, whose succulence is promoted at the expense of the seed, may, however, be corrected by any of the methods for restraining excessive vigour, which will be treated of soon, and the formation and perfection of the seed promoted accordingly.

The want of *pollen* in the anthers of plants is another cause of barrenness—in those of the *Pelargonium*, that shed their pollen before the stigmata are prepared to receive it—and unless the anther of another flower be applied to these stigmata at the proper period, there is no fertility from seed. In the greenhouse or any confined place to which bees and flies have no access until the season of impregnation has passed away, there is occasionally a total barrenness. There are numerous monstrous creations in the vegetable as in the animal world—those of course are seedless also.

Hence will appear the necessity of resorting to some artificial methods of increasing plants.

The most important and curious, are those of budding and grafting; plants are extensively multiplied also by cuttings, slips, and layering.

If a scion be detached from one plant, and properly inserted into another, the elaborate fluid called *cam-bium* causes their coalition, provided they have the power of producing new tissues from the surfaces of their respective sections. If a bud be taken from one plant and inoculated into another, the sap in the stock causes a vital union, and in both cases, when this has taken place, the sap rises through the scion or the shoot which has proceeded from the bud, and descends unobstructed in its course. Should the channel of communication in the latter case—that is, the stratum between the inner bark and the alburnum, called the liber—be entirely divided across, the limb dies.

Yet a circular incision, known by the term *ringing*,

may be so made that the part operated upon shall not lose its vitality: "This operation consists in making a narrow incision during the season when the sap is in motion for the purpose of preventing its descent and causing it to generate an increased quantity of flowers and fruit above the incision; the wound closes afterwards, and the life of the limb is not affected. But repeated operations of this kind debilitate it, and too wide an incision kills it. In the tender parts of plants a tight ligature has the same effect. The practice, however, is not to be recommended. If the rings be not sufficiently large to cut off all communication between the upper and lower edges of the wound they are useless, and if they are, the wounds heal with difficulty."*

Neither grafting nor budding can take place effectually, unless the sap is circulated in both stock and scion; when it rises in spring the former operation proceeds, but the other cannot be performed until a much more advanced period, when the buds have been developed. The gardener, therefore, should avail himself of the most convenient time and season for procuring buds or scions. If he wants flowers from a rose-tree stock, for instance, in the same year, he can have them by making an early graft, but he could not have them from the same year's bud. Some plants do not bear budding so well as grafting, and others require from their nature to be inarched or layered.

The important operations of Grafting and Layering have been so well described in the *Penny Cyclopædia*, that we cannot do better than extract them entire, as we have received permission to do so.

Grafting.

"Grafting is an operation by which a portion of one individual of the vegetable kingdom is applied to ano-

* Lindley's Theory of Horticulture.

ther which is within certain limits of physiological affinity, so as to form a vital union, and consequently produce a reciprocal growth. Thus a species bearing small and austere fruit may be cut down, and the remaining part grafted with a scion from a tree of which the fruit is large and delicious ; and being nourished, but not changed in any essential character, this scion will form a tree, ultimately producing fruit similar in every respect, all other circumstances being the same, to that of the tree from which it was taken. The shoots of any particular variety may be cut into many hundred pieces, if sufficiently numerous, and, by grafting, each of them can be made to possess all the properties of an individual tree in the course of one season. In the case of cultivated fruits, as well as in many varieties of ornamental plants, multiplication by seeds is precarious ; and with regard to *hybrids* it is impracticable—at least no assurance can be had of a reproduction of the same variety ; on the contrary, a disposition is generally manifested to return to the natural wild state of the species. Grafting is in some instances the only means, and in many it is the most eligible, of preventing this. By it the peculiar richness of the fruit or the delicate tint of the flower which we especially prefer and admire can be perpetuated in an almost infinite series of individuals, each being the result of augmentation of the comparatively small original portion—this portion being placed in favourable circumstances for receiving an abundant supply of new and proper matter, on which it exercises its organizing powers, and effects a perfect assimilation, which causes a similar development of leaves, flowers, and fruit. Again, this newly-formed augmentation being every way similar to that from which it was derived, it will continue to exercise the same functions with regard to such new matter as comes within the extending scope of its organizing powers, the progress only becoming

arrested by such causes as naturally limit the growth of the parent tree. Propagation by cuttings, it is true, will equally continue the variety unchanged; but that process in numerous instances is slow: in others success is not attainable to any considerable extent.

“From what has been stated, the great importance and utility of the process about to be explained will be sufficiently evident.

“The limits within which grafting may be effected extend to species and varieties of the same genus, or at all events are confined within the same natural order. Hence the statements of the ancients having successfully grafted the olive on the fig, plums on pears, and the like, are not to be credited. Modern physiologists explain to us that such incongruities cannot take place, and repeated experiments have proved their assertions to be correct. The Romans understood and practised the art of grafting; but it is evident that they were in a great measure ignorant of its principles, for Pliny mentions some apples in his time so red that they resembled blood; and the reason he assigns is, their having been at first grafted on a mulberry stock! Tricks are so common in grafting, that Thouin, who wrote a treatise upon the subject, calls one the rogue’s graft (*greffe des charlatans*): this is not at all uncommon in Italy at the present day, and is one of the means by which the needy but clever Italian succeeds in enriching himself at the expense of the wealthy and dull-witted Northman. In a state of nature a birch has been seen growing out of a cherry-tree; but on inspection it was easy to perceive that a seed of the birch had vegetated in a crevice, communicating with the decayed centre of the cherry-tree, among the vegetable mould of which the birch seed had taken root. The Italian, by a similar process, makes an olive, a jasmine, a rose, and a

pomegranate, all *seem* to grow in harmony upon an orange. Scions, it may be observed, will often exist for a short time on stocks far removed from natural alliance; but such unions are never permanent, but merely subsist for a time, as they would if the ends of the scions were inserted into the moist substance of a potatoe.

“Pears may be grafted, not only on other pears, but also on the quince (which is very frequently done), and on the medlar, white thorn, or mountain ash. Peaches are budded either on the almond, or more frequently on the plum, their own roots not being suited to the cold soil of this country. In these cases, although the leaves and fruit of the peach and the plum, the pear and the mountain ash, have a very different appearance, yet botanists have determined that the stock and the scion belong to the same natural order.

“Having mentioned that one species is often grafted on another of a different genus, it becomes necessary to state the reason why such is in many cases more proper than on species of the same genus; and this leads to the consideration of the effects generally produced by the stock upon the graft. When the stock is of slower growth than the graft, as in the case of the white thorn and quince stocks and the pear, the consequence is a partial obstruction of the flow of the sap, which checks the over-luxuriance of the pear-tree, and its natural disposition to produce only wood for a number of years of its youth; the juices, rendered less abundant, become more inspissated, and fruitfulness is induced at an earlier age. This condition may be even carried too far; for the common quince increases so slowly in diameter compared with the generality of pears, that its vessels become inadequate for a sufficient supply of nourishment. The French, aware of this, employ the Portugal quince as

a stock for their pears, because its wood increases more in accordance with that of the latter. On the same principle (that is to say, a less copious supply of nourishment) trees are rendered more dwarf than they naturally are, and hence are better adapted for small spaces. On the contrary, a weak species will have a tendency to grow stronger if grafted on one naturally more vigorous. These are modifications induced by the stock on the graft extremely necessary to be known and attended to: for instance, apple-trees on crab-stocks, if injudiciously planted in a small garden, will soon overgrow their limits; whereas on the French paradise stock, the dwarfest of any, they are easily managed within a very small space; besides, the roots of the latter are very fibrous, and run near the surface, which renders them eligible for planting over a bad subsoil. Many species and varieties both of fruits and ornamental plants, natives of a warmer soil, are advantageously grafted on their hardier congeners, such as the peach and apricot on the plum, Chinese tender roses on the wild roses of our hedges, and many ornamental species of *Cratægus* on the *C. Oxyacantha*.

“The methods of grafting are of great variety. M. Thouin (*Monographie des Greffes*) has enumerated 43 modes of grafting, 39 of inarching, and 28 of budding. Many of these are however more curious than useful; and not worth being detailed. It will be better to explain the principle on which all modes of successful practice must depend, either as regards grafting, budding, or inarching.

“It is well known that the bud of a plant has the power of becoming a distinct individual, if separated from the parent, and placed in circumstances sufficiently favourable for its future development. But no development can take place unless the portion abstracted from any plant contain either a bud, or the

perfectly formed rudiments of one. Hence the portion intended to be propagated must contain a bud or buds. The diametrical increase of exogenous plants proceeds outwardly, in consequence of the formation of new layers of alburnum, interwoven into the peculiar texture of the tree by extensions of the medullary rays. The alburnum is interposed between the inner bark and the heartwood, with both of which it is in vital or organized union. The greater part of the heartwood of a tree may be bored out, and, though made a hollow cylinder, it will still continue to increase. The outer bark may be removed, and a new one will gradually be formed; but, if the alburnum be entirely destroyed, death will be the consequence.

It appears therefore that buds with some portion of alburnum are the parts essentially necessary for propagation; for although the heartwood and bark be organized, yet they are but passively so, and have not the power of extending organization to new matter when they are deprived of the media of buds and alburnum. Keeping therefore the importance of the latter in view, the best mode of operation is that whereby the greatest possible extent of the alburnum of the stock and graft is brought into exact contact, without making too extensive a wound. If the sections of alburnum can be made to coincide in every point, the result of the operation will be the most perfect that can be obtained.

“The modes of grafting most generally practised are, whip, cleft, saddle, and crown grafting. Of these *whip-grafting* is by far the commonest, and is performed as follows:—The stock is cut over, sloping, above a smooth and straight part. The end of the scion is cut sloping and thin towards the lower end. Then on the same side of the stock as that of the lowest part of the slope made in cutting off its top, a slice is cut clean off, in length equal to that of the cut part

of the scion, and in breadth so as to expose as much of the wood of the stock as will equal that seen in the slanting section of the scion. Both sections should be smooth and plain, and as regards the alburnum, they should be the exact counterparts of each other; or, if this cannot generally be the case, the coincidence should be as exact as can be on one side at least. A thin wedge-shaped tongue is made very near the upper part of the slope in the scion, and a corresponding nick in the stock to receive it. The top part of the scion is shortened to two or at most three buds, and fitted to the stock, to which it is tied with a strip of pliable matting; and the parts so united are then covered with grafting-clay, or some other composition, which remains till the graft has pushed, or as long as there is no danger of the matting, used as a ligature, cutting or galling the parts when they begin to grow, and to have an enlarged circumference. After the first loosening, it is often advisable to apply slightly a fresh bandage immediately; and in some cases a little clay or composition may be put round, should the union appear too tender to endure exposure to the vicissitudes of the weather.

“*Cleft-grafting* is performed by splitting the stock diametrically across the top, which should be cut horizontally, and then nicely inserting in one side a scion cut like a wedge. This mode is objectionable, because the deposition of young wood takes place for the most part in a projection exterior to the circumference of a circle having for its centre the axis of the stock; the top of the latter is consequently left long uncovered and becomes unsound from the wood being split to admit the graft.

“*Saddle-grafting* is the reverse of the preceding, inasmuch as the stock, instead of the scion, is formed like a wedge; and the end of the scion made to fit over it, like a saddle. It is preferable to cleft-grafting,

particularly where the stocks are small, or nearly of the same size as the scion; but when the stocks are large, it is by no means to be recommended.

“*Crown-grafting* is performed on large limbs with thick bark, or on large stems; in either case these are cut off at right angles; the bark is raised by thrusting in a tapering flattened piece of smooth hard wood, or ivory, between the wood and bark; this being withdrawn, the end of the scion, properly thinned as if for whip-grafting, but without the tongue, is inserted. Three or four scions may with propriety be thus inserted in the same branch or stem. This method is objectionable for the following reasons:—the section of the scion is plane; the part of the stock to which it is applied is circular; consequently, these surfaces can only come into partial contact. Again, the abrasion must be considerably larger than the space covered by the scion, particularly if the bark of the stock be rigid. If we compare this state with the principle laid down in the preceding part of this article, the result will be, what ample experience has proved to be the case, that even on large trees whip-grafting is preferable. In fact, the cavity on each side of the scion in crown-grafting must be filled with something; either air, which is injurious, or, if the tree be vigorous, a deluge of sap will flow to it; and it often happens that this, technically speaking, drowns the graft.

“Cuttings intended for scions should be taken from the trees before the movement of the sap commences in spring, and put in moderately moist earth or sand, and out of the sun’s rays. If the stocks be cut down at the same time it will be so much the better; any large limbs of trees which it may be found necessary to graft should by all means be cut in before vegetation becomes active, otherwise extravasation takes place and canker is in consequence induced.

“*Grafting Clay* may be made from any smooth clay, or adhesive clayey yellow loam, or brick-earth, mixed with one-third, or, according to some, one-half of cow-dung, free from litter, excepting that of hay, and if it contain none of the latter, some fine hay must be beaten up with the mixture; the hay answers the same purpose as hair in plaster. A mixture of clay and horse-dung is preferred by some. The fact is, that any composition will answer that will exclude the air, retain some degree of moisture, and at the same time prove not injurious to the barks of the stock and scion which it surrounds.

“*Grafting wax*, a compound of pitch, rosin, bees'-wax, hogs'-lard, and turpentine, has had a great reputation as a means of fixing a scion to the stock, but it is liable to two serious objections. In the first place it does not adhere and exclude air unless both stock and scion are perfectly dry when it is used; secondly, the winds in March, the general period of grafting, are excessively drying, and were it not for the moisture absorbed from the clay the scion would frequently be shrivelled, and dried up before it had time to vegetate; but resinous substances do not permit of any similar absorption of beneficial moisture.

“*Inarching* is a species of grafting, the success of which depends on the principles above explained. It is sometimes called grafting by approach, because in performing the operation the branches or stems of two contiguously growing plants are made to approach and unite; and this union is effected on the same principles as that of whip-grafting. Corresponding slices are taken off, a small slit being made upwards in the part that is to form the head, and another correspondingly downwards in the stock; being joined, the wounded parts are tied together, and covered with moss or grafting-clay. When properly united, that which is to form the top is by degrees severed from its

parent root, and thus transferred it ultimately becomes the sole ascending stem of the one to which it was made to unite.

“ It is generally believed that although the stock and scion are organically united by the operation of grafting, yet that no other effect follows the operation than what may arise from the slowness or quickness with which the stock allows the sap to rise upwards into the scion; and it is generally believed that the scion exercises no influence whatever upon the stock. It is however perfectly certain that a bud of a variegated jasmine, made to grow upon one branch of a large tree of a plain jasmine, will gradually give the variegated appearance to the plain stock. This was long since asserted, then denied, and has been lately proved to be true by new experiments.”

Layering.

“ Layering is an operation by which the propagation of plants is effected by laying down or bending the shoots, so that a portion of them can be covered with earth. A shoot so operated on is called a *layer*, and the point which furnishes the layers bears the name of *stool*. Some plants are so much disposed to emit roots that if their branches happen to come in contact with the earth they immediately begin to strike. But although it may be easily imagined that the observation of this common circumstance has led to the artificial practice, yet some additional operations besides that of merely bringing a shoot in contact with the earth are found necessary for many plants on which this mode of propagation is practised. The principle by which the operation is rendered effectual for the object in view is the following:—When the shoot of a species not freely disposed to send forth roots has merely its bent part inserted in the earth, the woody matter organized by the leaves passes down to

the roots nearly as usual; but if the communication along the alburnum is interrupted by an acute bend, twist, or incision, a *callus* will be formed, from which by degrees spongioles are emitted, and thus roots ultimately produced.

“The part of a shoot intended to form a layer should be divested of leaves where it is to be covered with the mould, and a slit should be made on the bent part, or the branch should be twisted half round at the bend so as to disarrange the woody tissue, or the bark should be half or three-quarters *ringed*. the shoot is then fixed down by pegs or hooked sticks, cut down to within an inch or so of the ground, and covered with good mould, which must afterwards be kept tolerably moist. In general roots are emitted in a few weeks, and by the end of a season young plants are obtained quite fit for transplantation. Some plants however require to be left for two years *on the stools* before they are removed, and there are some which can hardly be made to root at all in this manner.

“Plants so situated as to render it impossible to bend their branches to the ground may nevertheless be layered by having their shoots introduced into a pot or box of soil elevated to them, and supported in a convenient position. This is a common practice among the Chinese, who cause branches of trees to root in this manner by partially ringing them, and covering the parts so ringed with a ball of clay, which is kept moist.”

For very tender-skinned plants, a tight ligature above the joint will be sufficient, without the use of the knife, to stop the descent of the sap, and so cause that joint to organize roots, if it be laid at that place in earth or moist moss (according to its habits), at a depth proportioned to its bulk and texture. The strawberry and several other plants have so great a disposition to produce roots at their numerous joints,

when they come in contact with the earth, that they become layered without care; others require to be pegged down to the earth, but not earthed. If cuttings or slips be taken from plants that have leaves and stems, and set in earth under suitable circumstances as to heat and moisture, the sap which they contain will enable them to push out roots and buds, from which will issue the leaves, designed to perform their proper functions in establishing the independent existence of these fractional portions of plants.

This wonderful support of vegetable life enables some plants to reproduce themselves, through their leaves alone; if their stalks or petioles be set in nutritive mould, and with sufficient heat and moisture, they will root; and the leaves of most of the succulent plants, if laid on earth, with the upper side to the light, will root sooner or later.*

The theory of this, however, is not exactly determined; the vegetation may arise from the organizing power of the sap, rather than the general diffusion through the plant of embryo buds.

The nature and properties of the sap fluids being so far explained, I may proceed to the subject of pruning and training fruit trees, which are among the most difficult and important branches of the gardener's education.

Pruning affords one of the numerous evidences of that universal law of the Creator, by which his gifts are to be improved and extended by the industry and ingenuity of man. Experience and science have brought the art to a wonderful degree of perfection, and caused the abandonment of many errors in which our forefathers were involved. But as, with the amputating knife or lancet in the hands of an unskilful surgeon, a great or irremediable injury may be done

* See Loudon's Suburban Horticulturist.

to the patient, so a pruning blade used by a bungling gardener will occasion extensive injuries to the vegetable unskilfully operated upon. They who undertake delicate operations, therefore, ought first to have the necessary qualifications for performing them. I shall say as much upon the subject of pruning, &c. as may tend to give to the unskilled gardener the necessary elementary information.

What is termed winter pruning—which alone need be adverted to in explanation of the general theory—should not be postponed to spring when the sap is circulating (unless in some peculiar case when it is expedient to do so, in order to subdue too much luxuriance in the tree,) because pruning then would derange the regular system of vegetation, and produce injury accordingly; some trees are in danger of bleeding to death, if pruned when the sap is flowing. The vine is very tender in this particular when its vessels are filled with sap, because they have not a sufficient power of contraction to arrest the flow—death succeeds from the exhaustion of the vital fluid.*

“The first thing, then, to examine, is the peculiar nature of the plant to be submitted to the operation, and the particular mode of pruning that its habits may require: for example, the fruit of the fig and walnut trees is developed on the wood of the same season; of the peach and nectarine on that of the second year; that of pears, &c. generally on the wood of the shoot of

* The vine is most remarkable for delicacy in this point. Mr. Knight, who had reason to believe that there was no remedy previously known to gardeners for staunching the discharge of sap, found the following compound effective for the purpose: viz. Four parts of grated cheese, and one of calcined and powdered oyster shells, or any pure calcareous earth: he applied this mixture, which proved so powerful in checking the discharge of sap, that he could safely amputate a branch at any season by making use of it.

two or more preceding years. It is obvious, then, that these three classes of fruit trees require a peculiar method of pruning.”*

The same able writer (Dr. Lindley) dwells upon the fact that the season of maturity may be changed by pruning in a certain manner—as in the case of the raspberry, from which a second crop may be obtained in autumn, by taking away the most vigorous stems (which otherwise would produce fruit-bearing wood) to within two or three eyes of the bottom. The sap, if the first elements of the fruit in spring be destroyed, serves to form fresh fruit buds, which of course produce, by this retarding treatment, at a more advanced season.

The general object of pruning is to render plants as productive as possible, and to make them assume the most appropriate form: their fertility is promoted by cutting away redundant growth, and giving to the sap the precise direction in which it is required to flow: if a tree or other plant be too luxuriant for the space to which it is limited and disposed to vegetate to excess, the knife and the rubbing off buds subdue its too great vigour, reduce it to proper limits, and compel it—with the aid of training—instead of increasing its bulk and vigour by superabundant leaf branches, to bear blossoms and fruit: moderating the flow of sap, and producing a partial stagnation of it by the combined means of pruning and training, give the desired tendency to fruit-bearing. If a great portion of the shoots and buds which fruit trees produce every year were not removed at the proper seasons, their fruit would degenerate in size and quality; but by taking away some of them, the remainder acquire greater vigour; and on the same principle, by removing a branch, or part of one, the remaining portion is

strengthened.* Pruning the roots tends to diminish excessive vigour in a tree, because it is by the roots that buds and leaves are nourished; and if these be too luxuriant, as already stated, in substance, the disposition to forming fruit buds is lessened.

Pruning is not however confined to trees and shrubs, it is necessary for many herbaceous plants. "The topping of beans and the picking off potatoe blossoms are operations belonging to pruning; so are the cutting off of withered flowers for the sake of neatness or to prevent the production of seed, and even the mowing of grass lands."†

But I am only about to consider the pruning of our ordinary fruit trees, adverting at the same time to their natures, for unless these be explained, the best

* "One of the specific principles of pruning is also the stimulus given to vitality. When the leading branch of a small tree, which, perhaps, has not been growing well, but has got the roots fully established, is cut back to one bud, not only is the rush of sap, which should have supplied the whole buds, diverted into the one, and the shoot thus made more vigorous, but the vitality of the tree has acquired an impetus that it did not formerly possess. From a lazy slow-growing plant, it has been converted into one of a quick, healthy, vigorous growth; a stimulus is given to the roots also to increase, and the tree is entirely renovated. The benefit is lasting, not temporary, and will continue if circumstances are favourable, and no check of bad soil or bad weather ensues to counteract its vigour. It is thus that the forester cuts back his oak plants in the forest, after being a few years planted, and trains a single shoot from the bottom, knowing well that the vigour of this one shoot will be lasting; that the impetus given to the growth of the tree will continue; and that in a few years the cut over tree will be many times larger than those allowed to stand uncut. It is thus that nurserymen increase the vigour of their young plants by pruning; and that gardeners, when pruning for wood, cut farther back than when pruning for fruit."—*Suburban Horticulturist*, Appendix.

† Ibidem.

directions with regard to pruning and general management will be liable to misapplication.

Pruning and general Management of Peach and Nectarine Trees.

The nature of these trees is essentially the same, and consequently whatever is directed in regard to the management of the peach is equally applicable in the case of the nectarine. The article PEACH in the Penny Cyclopædia contains very suitable information on the subject in hand, and is here essentially given, with some additional observations :—

The peach-tree (*Amygdalus Persica* or *Persica Vulgaris*) is generally considered to be more especially a native of Persia. It was known to the Romans, and brought to Italy, where it became distinguished by the name of *Persica*; and this name it still retains under various modifications in the different countries of Europe; thus, *peach* is evidently derived from *pêche* or *pêcher*, the latter being formerly written *persier* by the French. But the peach is not indigenous solely in Persia, for it has been found growing wild in various parts of Turkey in Asia. Pallas describes it as existing in the more southern parts of the Caucasus. From the frequency of its occurrence in a wild state, and the perfection which it attains under the most limited share of cultivation in regions situated between 30° and 40° of latitude, these parallels may be presumed to include its favourite habitat. Isothermal lines describe however a wavy tract; and the peach may even find a congenial climate to a considerable extent on both sides of the above limits; but the locality must be very peculiarly circumstanced in which it will acquire full perfection beyond the 48th parallel on the one hand; and, on the other, its deciduous nature requiring a cool season of rest, unfits it

for the continued high temperature of a tropical climate.

It is to be regretted that there are as yet no perfect registers of the temperature of places where the peach in its natural state attains the greatest perfection. Such would at once form the surest guide for the establishment of principles for the regulation of that artificial climate which the tree requires to ensure its fruiting in perfection in Britain, and for which purpose the aids of glass and fire-heat are provided.

The peach withstands our winters unhurt, if they are not unusually severe. It even succeeds in America exceedingly well as a standard, in latitudes where the winters are much more intense, but the summers hotter, than with us. This is in conformity with the well-ascertained fact, that all deciduous trees suffer less from severe frost in winter when their wood is perfectly matured by sufficiently warm summers, than when grown in climates where they cannot enjoy that degree of summer heat which they require for the due formation of their tissues. Hence, in the north of England, young peach-trees in the open ground will be partially injured by a degree of frost which, though of equal intensity, will not injuriously affect similar plants in the neighbourhood of London. The peach also succeeds as a standard in Italy, the south of France, and other continental countries of Europe having summers equally hot; but it may be observed that where the mean temperature of the summer months is above 70° , or that of the warmest month above 75° , as is the case at Rome, and still higher at New York, the *melting* varieties of the peach do not possess that rich succulence which they acquire against a south wall under the more moderate summer heats of the climates of London or Paris. On the contrary however, the *firm-fleshed* or *clingstone* peaches, which are little esteemed in this country, are preferred

in America and other places subject to extreme summer heat.

If the mean temperature of February amount to 40° , and that of March to 44° or 45° , the peach-tree will be in full flower against a wall with a south aspect about the last week in March; and the general crop will be ripe in the last week of August or first week of September, provided the mean temperature of April be 49° , May 55° , June 61° , July 64° , and that of August 63° . This period of *five* months required for the maturation of the fruit from the time of flowering, on the open wall, may be reduced to *four* by means of fire-heat and the protection of glass; but it cannot be advantageously diminished any further. This fact being borne in mind, it is easy for the gardener to know at what time to commence forcing his peaches in order to obtain a crop in a given month.

From the natural climate and habit of the peach-tree, it is obvious that when forced it must be flowered under a comparatively low degree of temperature. It cannot therefore be well forced simultaneously with the vine; for the temperature of March, which in this climate serves to bring the peach into flower, does not unfold the buds of the vine, this being only effected a month or six weeks farther in the season by a mean temperature of 55° . The peach may be subjected at first to a temperature of 45° , but not exceeding 55° till the flowering is over, after which it may be gradually raised to 60° , and not exceeding 65° , till the substance of the stone is indurated, after which from 65° to 70° may be allowed. This is to be understood as referring to the application of fire-heat. Even in the total absence of the latter, sun-heat will frequently raise the temperature much higher; but in this case a large portion of air should be supplied, not however all at once after the temperature of the house is found too high, but gradually as the temperature increases. Air

should be always freely admitted through the day when the weather is at all favourable.

Light is so essential, that unless peaches be trained near the glass, the fruit will neither acquire due colour nor flavour. Vicissitudes of dryness and moisture must be avoided. The roots should be well supplied with water before the fruit begins to ripen off, because at a later period none can be applied without deteriorating the flavour.

The management of the peach-tree can only be correctly understood by those who are aware of the disposition of its buds and its mode of bearing. The leaves on the shoots of the current season are produced either singly, in pairs, or in threes, from the same node. In the course of the summer, or early part of autumn, a bud is formed in the axil of every individual leaf, and these are termed single, double, or triple *eyes*, or buds, according as one or more are produced at each node. In the following season, these buds develop themselves either as flower-buds or young shoots, and previously to pruning it is necessary to distinguish the one description from the other. The flower-buds are plump and roundish; the wood-buds are more oblong and pointed, and one of these is generally situated between flower-buds in the case of triple buds occurring at the same node. It is therefore expedient in pruning to shorten a shoot to these triple eyes if possible, or in their absence to a leaf-bud; but never to a fruit-bud only, for no shoot could be prolonged from it, nor would the fruit attain perfection, owing to the want of leaves in immediate connexion with its footstalk. In selecting buds for the purpose of propagation, *single* wood-buds only should be chosen.

The mode of bearing is solely on shoots of the preceding summer's growth.

The peach is propagated exclusively by budding; for although it can possibly be grafted, yet the trees

do not afterwards succeed, gumming being apt to take place at the union. It is rarely budded on the peach stock, but frequently on the almond, especially in France. In this country however it is propagated almost entirely on the plum stock, which is not only much hardier, but also possesses the property of spreading its roots nearer the surface than either of the two preceding kinds; thereby affording to the peach a more congenial nourishment in consequence of the roots being within the influence of the solar heat. Whereas the peach stock tends to strike downwards strong tap-like roots beyond the depth of the stratum warmed by the summer-heat; and although the latter trees grow vigorously for a few years, or so long as the roots have not penetrated too deep, yet they afterwards become sickly, their foliage becomes narrow, acquires a yellowish colour, and the trees ultimately perish. The *muscle* and *white pear-plum* are the varieties of plum stocks on which the peach is budded; the latter is esteemed the best. The French prefer the St. Julien plum stock, which answers exceedingly well.

The peach succeeds in any rich fresh loamy soil; but the subsoil, like that for all fruit-trees, ought not to be retentive, and a very complete mode of drainage is absolutely necessary. It would also be desirable that the roots should not be allowed to penetrate deeper than two feet from the surface. No objections could be made against the roots following their natural tendency downwards to whatever distance they might go, if their extremities were at the same time in a medium congenial to the peach as regards temperature; but this cannot be the case in Britain, unless perhaps some chalk subsoils may form exceptions. It is known by experience, that when the roots are in a medium of much lower temperature than the mean of that of the atmosphere during the growing period, the

trees do not thrive, nor does the fruit, under such circumstances, acquire flavour; mildew makes its appearance, and no application will effectually cure it without inflicting a material injury on the foliage. The best remedy for mildew is to take up the tree carefully in autumn, renew the soil, and replant the tree, spreading the roots near the surface. When peach-trees are young, they generally grow very luxuriantly; and if dung be abundantly incorporated with the soil, disease is almost certain to manifest itself by the exudation of gum. It is therefore advisable to defer the application of manure till the trees begin to bear fruit, and then to apply it only as a top-dressing, so as to maintain a vigorous but not an over-luxuriant state of growth, and to retain the new roots near the warm surface of the soil.

Various modes of training the peach have been adopted, with different degrees of success. That of course has proved the best which admits of the most equal distribution of sap throughout the respective branches, and likewise the production of a sufficient number of well-placed shoots for replacing those that have once borne fruit, the shoots being only useful for such purpose in the season immediately following that in which they are produced. The fan method, and a modification of it called Seymour's training, are most in conformity with the above principles. A common error in the fan method is that of disposing a few of the first-produced branches so as to represent equidistant radii; the consequences of such disposition are an excessive degree of vigour in the central and most upright, but at the same time those inclining horizontally become comparatively weak, linger for a few years, and then die off. Their share of the sap is soon appropriated by the more vertical branches, some of which will assume the character of stems, and prove unsuitable for producing fruit-bearing shoots. Cut-

ting these back is frequently the only alternative in order to obtain other shoots for the purpose of furnishing the lower part of the wall. By this misdirection of the energies of the tree, several years' growth is wasted, and when it becomes necessary to cut out such large branches, the tree receives a shock which renders it incapable of bearing such fine fruit as a more skilful management will ensure. It may be briefly affirmed that all methods of training are bad which admit upright shoots to compete with horizontal ones; for the former will grow with a vigour ten times greater, in many instances, than the latter, owing to the strong vertical tendency of the sap. Although the ascendancy gained by a vertical shoot over a horizontal one is considerable in the current season of their production, yet it bears but a trifling ratio to that which would be gained in successive seasons, were the vertical portion allowed to proceed without interference from the pruning-knife. If however a central shoot be annually trained, upright in the first instance till it attain the height of fifteen inches, then kept in check, by pinching off the terminal bud, and training all its after-growth during the season declined from the perpendicular; and if these central shoots be uniformly cut at the winter pruning to within a few buds from their bases, no material injury would then result to the side branches, the vertical tendency against them being thus limited to a single summer shoot. This principle is the basis of the following mode of training.

In cutting back the central shoot, two buds, well situated for producing side branches, and a third for an upright, must be left. The first production of side branches, which are intended to produce the lower radii of the fan, must be trained at some elevation in the first instance, and afterwards gradually brought to a horizontal position. It is necessary that they should be brought down, in order to furnish the lower part of

the wall, although by so doing they are placed at a disadvantage as regards the maintenance of vigour comparatively with those above them. The latter should have their foliage partially reduced when they exhibit signs of too great vigour; and the lower should have their ends turned upwards, for this will encourage a much greater flow of sap than if they were kept wholly horizontal. In short, these lower branches should be allowed to ascend, on springing from the stem, at an angle of 45° for about six inches; then they should be made to curve to a horizontal position towards autumn. Next season the young shoot from the extremities will naturally tend upwards; incline it to its horizontal position before it gets too strong, and continue to do so as it proceeds in growth; but leave the growing end always elevated.

The side branches obtained in the second season may be allowed to form two each, if sufficiently vigorous, at some distance from their base, and as their divergence affords room. The branches produced after those last mentioned, and indeed all the upper ones, may be subdivided into two, or even three. By this method of training the lower branches become strong, and acquire a well-established communication with the roots before the upper are in existence, so that there is little danger of the former dying off, as usually happens when horizontal and vertical branches are started at the same time.

By repeating the process here detailed, all the principal branches are ultimately produced, to the number of between thirty and forty, and disposed in a fan-like form, diverging, not exactly from a common centre, but from a short axis. These branches support the shoots on which during the second season of their existence, the fruit is borne. Buds for the origin of these shoots should be selected at the distance of every twelve or fourteen inches along the upper side of the

branches, that being the side from which they are obtained with the greatest facility, owing to the upward tendency of the sap. As these shoots are being prolonged during the summer, they should be trained so that their foliage may have the fullest exposure to light; but although the foliage of one shoot ought not to overshadow that of others, yet the naked branches are benefited by the shade of leaves, for old bark exposed to the direct rays of the sun is apt to be scorched.

The shoots produced and trained during the summer for successional bearing ones, must be shortened considerably at the ensuing winter's pruning, and care must be taken not to cut above a node where there is only a blossom-bud or buds, but to one that is seen to have a wood-bud, that is, such as a shoot will proceed from. In the following spring, the blossom-buds are unfolded, and soon after the wood-buds begin to push the rudiments of shoots, one of which, next the base of each fruit-bearing shoot, must be preserved and encouraged with special care, in order to supply the place of those that are bearing fruit. The fruit-bearing shoots being useless for such purpose a second time, must therefore be cut away at the following winter pruning, when the young shoot, retained during the summer, is shortened like its predecessor, and trained for the purpose of bearing fruit and producing a successor, which likewise becomes subject to the same routine treatment.

The preceding directions are to be followed in order to the essential pruning for the development and maintenance of the form of the tree; but as a great number of superfluous shoots will be produced, the mode of their removal requires to be noticed. The operation is termed disbudding, and it commences as soon as the young shoots can be laid hold of, but should be completed in a gradual manner. A portion of such front-shoots as have no fruit at their bases are first re-

moved, then part of those elsewhere situated, making exceptions of the lowest on each bearing shoot, for succession, and of the terminal one. By degrees all are removed, excepting the two last mentioned and those from nodes where fruit is set and promises to attain perfection. Finally, the terminal ones and those left on account of having fruit at their bases are shortened, or stopped, to about three inches in length, or so as to have several leaves for the purpose of maintaining the flow of sap and elaborating it for the nourishment of the fruit. Should these or the terminal shoots again push, such secondary shoots must be pinched off above the second leaf from the origin.

Thinning the fruit is generally done much too sparingly. The vigour of the tree should of course be taken into consideration. As a general rule, one fruit on each bearing shoot, or two at most, are all that ought to be left. By leaving too many, the size of the fruit is diminished, so that the aggregate weight of flesh is probably but little if at all increased, whilst that of stones, to the great weakening of the tree, becomes materially so. Some remove the flower-buds to a considerable extent, a practice which is very proper. It is advisable however to preserve several on each shoot, in order that a choice may be made of one or two of those likely to take the lead.

The surface of the border should be frequently stirred; and when the weather is dry, watering will be necessary both for the border and foliage; but the use of cold spring water must be avoided. The ravages of the green fly (*Aphis Persicæ*) must be carefully guarded against. The best known remedy is to dust the tree, after syringing, with snuff, or powdered tobacco leaves. Copping-boards, made to project about a foot, are of great utility in protecting the blossoms; but after the danger of frost is over, the coping ought to be removed.

The best varieties of peaches in cultivation at the present day in this country appear to have been obtained from France. Although designated by various English names, most of the sorts have been traced to be synonymous with the French peaches.

The different varieties admit of the following classification:—

I. *Leaves serrated, glandless.*

a. Flowers large	.	{	Clingstones .	§	1.
			Melters .	§	2.
b. Flowers small	.	{	Clingstones .	§	3.
			Melters .	§	4.

II. *Leaves crenated or serrulated, with globose glands.*

a. Flowers large	.	{	Clingstones .	§	5.
			Melters .	§	6.
b. Flowers small	.	{	Clingstones .	§	7.
			Melters .	§	8.

III. *Leaves crenated or serrulated, with reniform glands.*

a. Flowers large	.	{	Clingstones .	§	9.
			Melters .	§	10.
b. Flowers small	.	{	Clingstones .	§	11.
			Melters .	§	12.

Six more sections might be formed by admitting subdivisions of middle-sized flowers; but no varieties worthy of cultivation, and indeed very few of any description, being referrible to such sections, they have been consequently omitted.

The following list contains the best varieties of peaches, arranged according to the sections to which they respectively belong in the above classification.

Section 2. Early Anne, Noblesse, Malta.

Section 4. Royal George, Royal Charlotte.

Section 6. Acton Scott, Grosse Mignonne, Barrington.

Section 8. Bellegarde, George the Fourth, Barrington.

Section 10. Pourpré Hâtive.

Nectarines admit of a similar classification. The best varieties are the Elruge and Violette Hâtive; having reniform glands and small flowers, these are included in section 12.

Pruning and General Management of the Pear-Tree.

The wild pear-tree (*Pyrus communis*), from which the numerous cultivated varieties have originated, has a wide indigenous range, extending over a great part of Europe and Asia, within the limits of temperate regions. It is to be met with in certain localities in the southern parts of Britain. The old varieties of pears are, however, getting rapidly out of cultivation, and giving place to others of recent origin, superior in quality, and much better adapted for this climate than the old kinds appear ever to have been. Few of the latter could be successfully cultivated without the aid of walls; whereas most of the new varieties produce abundance of excellent fruit on standards or dwarfs in the open ground. Even in France the old varieties are now decaying, although the climate is there most congenial to them.

The pear is chiefly propagated by grafting or budding on the wild pear stock, or on stocks raised from the seeds of cultivated pears, called free stocks; the former are however to be preferred. It is also grafted on the quince, which is most proper for dwarf trees, or for moist soil, and has also the effect of bringing the trees earlier into a bearing state. It may be also grown upon the medlar, and the white thorn (*Crataegus Oxyacantha*), but on these the disparity of growth

between the respective stems occasions a short duration of the union. The enlargement of the pear-stem in the case of strong growing varieties is indeed generally too much for quince stocks. There are several varieties of the quince, and the sort that has the broadest leaves, and which has the nearest correspondence in regard to horizontal growth with that of the pear, should be preferred for stocks.

The pear-tree will thrive in any rich loamy soil; but it is only where the subsoil is naturally congenial, or rendered so artificially, that it will continue to produce good crops of well-flavoured fruit. A clay subsoil is bad, and so is in fact any other that will hold water. Good drainage is absolutely necessary, and shallow planting cannot be too much recommended. The monks in former times were aware of the advantages arising from having the roots near the surface; for stones and slates have been found below old fruit-trees, which had been planted at monasteries once in their possession.

Manure is not so liable to prove injurious to the pear and apple as it is to stone fruits. On the contrary, unless the trees be growing too strong, manure, judiciously applied, will always prove beneficial.

Pears are deemed worthy of the expense of walls, but this is often an unnecessary expenditure for want of a properly formed border, and thorough draining, where the subsoil renders such necessary. Brick rubbish is a good bottoming; or a bed of concrete, two or three inches thick, laid sloping from the wall towards a drain in front, is unquestionably one of the best modes that could be practised; and it is the only effectual one to prevent the roots from penetrating beyond a limited depth; for they will often find their way through a stratum of stones or brick-rubbish. The depth of soil need not exceed $2\frac{1}{2}$ feet. The best

season for transplanting is as soon as the leaves have fallen in autumn.

Standard trees may be planted from 20 to 30 feet apart, or where vegetables are intended to be cultivated, the distances may be 40 feet between the rows, and 20 feet in the rows. Dwarf trees, on quince stocks, will not require more than 15 feet distance. Wall-trees should be at least 20 feet apart, and for some varieties 30 feet will not be too much.

The modes of training the pear-tree are various. Against walls, the three principal methods are the fan-shape, its reverse the pendulous, and intermediately the horizontal, which is that most generally adopted. In the fan method the central part of the tree, from the upright position of the branches, or their near approach to such, is apt to become too strong. On the contrary, the pendulous training induces debility when the trees begin to bear heavy crops. By annually cutting back a central shoot to about a foot, and training branches horizontally, right and left, the vigour of the tree is equally distributed. It often happens that in this mode the branches only produce fruit towards their extremities. When this is the case, a shoot should be encouraged near the origin of the horizontal branch, and trained in the interval, and at some distance, say three feet; farther along the branches another may be laid in a similar manner, and so on, care being taken that each is stopped when its elongation reaches the place where another has its origin. These shoots will generally become as fruitful, after two or three years, as the portion of wood of the same age near the extremities of the branches themselves.

Training against espaliers was formerly more practised than at present. The difficulty of getting the old varieties to bear, apart from a wall, together with the expense of erecting the espalier, and the liability of its materials to decay, have no doubt tended to bring

this mode into disuse. It is however worthy of remark, that a greater extent of foliage can be exposed to direct light by espalier training than by any other on an equal extent of ground. New varieties will do away with the objection of unproductiveness; and although the contact of metallic substances is not congenial to vegetable growth, yet the principal supports of the espalier might be constructed of cast-iron, which would prove an ultimate saving; the small intermediate wood-work that would be requisite could be easily replaced.

In the cultivation of pears as standards, the head is allowed to take nearly its natural course, being only subjected to such regulations, by pruning, as are necessary to preserve the equality of the principal branches with regard both to strength and distance; and likewise to render the whole sufficiently thin, in order that the sun's rays may be freely admitted.

In some situations, many kinds of pears remain long unfruitful; the best means of rendering them otherwise is of course a most important desideratum. So long as circumstances are very favourable for the growth of wood, blossom-buds are not likely to be produced; the production of the latter results from a more inspissated state of the juices; and will not take place whilst a copious flow of sap is continued. This may be interrupted by ligatures, ringing, grafting, or other analogous means. But these means frequently afford only a temporary remedy, and a repetition of the process is at the expense of the energies of the tree, so that it is rendered too weak for future bearing. There is still a more important object which the above means are not calculated to effect. If the roots are in a cold subsoil or out of the reach of solar influence, the fruit will only acquire an inferior degree of flavour. If however the tree be carefully removed (for doing which autumn is the best season), the soil well dug, or

even renewed, and the tree deprived of such roots as cannot be brought to a horizontal position, namely, that in which all the others should be placed when replanted, and if this be done as shallow as possible—a satisfactory check will be occasioned, fruitfulness induced, and flavour communicated.

The management of dwarf standards is similar to that required for tall standards, excepting that the head is formed at the height of one or two feet from the ground, instead of six, the usual height allowed for the stems of standard trees in orchards, or where under-cropping is carried on, as in market-gardens, where the dwarf-headed trees would obstruct the growth of vegetables for a considerable distance from their stem. Dwarfs however have some important advantages; a large head is sooner formed, and the fruit is not so liable to be blown down.

The French modes of training *en Quenouille* or *en Pyramide* cannot be strictly adopted in this country with advantage, owing to the richness of the soil and moisture of the climate, circumstances which are favourable to the production of shoots rather than fruit-buds, and this tendency is farther encouraged by shortening the shoots to the extent which the French recommend. In both these modes, tiers of branches proceed from a central stem; in the pyramidal form the branches are horizontal, each tier being successively shorter than the one below. In the *Quenouille* the branches are curved downwards, and this mode might be successfully practised in this country, by leaving the shoots at full length, care being taken that all upright shoots are shortened in summer.

The pruning of standard pear-trees is usually confined to the winter regulation of the branches by thinning, and shortening where the subdivision of branches is desirable or where they are too weak. Wall and espalier trees require both a summer and winter prun-

ing. In summer a number of shoots will be produced beyond that which will be required for training. If these are allowed to grow without interruption during a considerable part of the season, and then at once cleared away, the tree is apt to receive a shock from which it does not soon recover. If the shoots are shortened too much or too early, the buds, which would otherwise have proved blossom-buds in the following spring, will immediately become excited (other channels for the flow of sap being cut off), and burst into shoots.

In order to avoid this, which is a case of frequent occurrence, a portion of these superfluous shoots should be first stopped at an early period, and afterwards another portion; by the middle of June part of them may be cut back to within two or three inches of their bases, and thus by degrees the whole will be ultimately reduced, without any great or sudden derangement of the general flow of the sap. The winter pruning is attended with less vital danger to the tree. It consists chiefly in shortening spurs to the lowest fruit-buds and judiciously thinning them.

If borders are well made, there will be less occasion for raising the trees after they have been once planted. Still after four or five years, it will, under all circumstances, prove advantageous to remove the trees from the wall, trench the border, and replant, spreading the roots near the surface in a horizontal direction, or inclining slightly downwards. Cutting the roots, without entirely removing the tree, is attended with the disadvantages arising from the soil being only partially loosened, and the difficulty of reaching the perpendicular portions of the root.*

* Penny Cyclopædia.

*Pruning and general Management of the
Apple-tree.*

The trees are propagated on the crab or *free* stock, and also on the Paradise, Doucin and French Paradise; the three last being best adapted for dwarf trees, and for those intended to be planted where the roots require to be kept near the surface. In other respects all that is directed with regard to the management of the pear-tree, is equally suitable in the case of the apple-tree.

MONTHLY OPERATIONS.

If the kitchen garden only were under consideration, I should commence with one of the late autumnal months, in which preparations are made by digging, trenching and manuring, and the sowing of some seeds for the ensuing year; but as the work in the Floral and Fruit departments (which are comprehended in my plan) commences with the year, when the kitchen garden is also exhibiting symptoms of animation, I shall begin, in conformity with the general custom, at the first month.

JANUARY.

The *stove* and *greenhouse* plants, which are in a state of perfect repose and lose their leaves, such as Gloxinia, Achimenes, Gesneria, &c. should not be watered at all until they begin to show signs of life. Pelargoniums, which do not lose their leaves, though they make no growth until February, require a little water to keep them alive, but not to forward them. When the mould in the pots becomes so dry as to be easily reduced to dust with the fingers, you may water,

but so lightly as will prevent excessive dryness on the one hand, which would cause the entire extraction of moisture from the roots, and that degree of dampness on the other, which (and this often occurs when the drainage in the pots is imperfect) would cause them to rot; in short, an equable and very moderate moisture for the growing plants, should if possible be preserved. The watering ought to take place in the morning, in order that the dampness should pass away before the houses are closed at night. The *Camellia*, which when growing freely requires abundance of water, would be greatly injured if supplied with it except in its advancing state of vegetation, and according to its growth. Those plants which are nearest the flues will require more attention, in this respect, than those which are distant from them, and the temperature of the water ought to be a few degrees higher than that of the house. The late Mr. Loudon has judiciously remarked, that the application of water to plants in a dormant state, "is one of the commonest and most injurious errors committed by persons unacquainted with the principles of culture; it does comparatively little harm to plants in the free soil in the open garden; but to plants in pots, and especially to those having suffruticose stems, such as the *Pelargonium*, or to hair-rooted plants, such as *Heaths*, and to all bulbs, it is extremely injurious, and often destructive of life. In the first case, more water is absorbed by the roots than can be decomposed or evaporated by the leaves; in the second case, the roots are suffocated and rotted from their delicacy; and in the third, rotting takes place from mere organic absorption; for when the leaves of bulbs decay, their roots decay also, and consequently they cannot absorb water by their spongioles; but absorption by the tissue is still going on, the vessels become surcharged and burst, and the bulb rots. Hence in the case of bulbs, and such-like

plants in pots, the soil in which they are kept should contain no more moisture than what is necessary to keep the bulb, tuber, or corm, in a succulent state; but in proportion to the dryness in which bulbs are kept at this season, should be the abundance of the supply of water when they begin to grow." Heaths require great attention with regard to watering; if allowed to become too dry, they speedily lose the power of absorption, and death ensues with little indication of its approach. Excessive dryness must therefore be carefully guarded against; neither should a uniformly moist state be always maintained. When they are watered at the root, the water should be made to reach the very centre of the ball; and the supply should be renewed when a moderate degree of dryness has taken place.

Sand or coal ashes should always be at the bottom of the pots if there be danger of over-watering, to allow the water to trickle off, and portions of free-stone have been most advantageously intermingled with the mould to prevent the moisture from becoming stagnant.

Charcoal appears to be especially suitable as an absorbent of moisture and gases, and hence a stimulant to many plants if combined in the proportion of about one to three parts of earth: in the case of Fuchsias it has been recently proved equal in power with bone-dust in imparting vigour, though it does not apparently contain any nutritive qualities.

Let the warmth of the *storehouse* be about 65° during the day, falling to 55° at night, for this reason—and I shall endeavour throughout my observations to state the principles on which particular practice is founded as well as I can, when the subject admits them—that the functions of the plants are altogether suspended, or much less active, by night than by day: the digestion of their food is interrupted, and therefore heat,

which excites to vegetation, ought at that time to be diminished, for though vegetation will go on at night under the influence of warm moisture, plants thus growing do not acquire any actual increase of substance, but are drawn out like a thread of metal to more tenuity at the loss of strength and body.*

Greenhouse, Pits, and Frames.—The temperature of these should be about 45° , and in order to maintain this, matting must be occasionally laid over the frames. The Camellia, Epacris, and some of the Ericas, are among the most striking flowers at this season. The former will grow and flower in a mild part of our country, in the open air, if protected by a screen of matting during frost; its flowers, however, do not open well if they appear before the beginning of April in the open garden, and they are liable to injury from frost. The Camellia is so fine a flower, and so precious from flowering at this season, that it well deserves the best place in the greenhouse and your attention to keep up successions for spring bloom, which you can do by *gradually* changing the plants from colder to warmer temperatures.

It may be necessary to shift the plants that have done flowering, if the roots have grown so freely as to require more room; but as changing them disturbs the functions of the roots, the true season for doing this is in August, when the Camellia closes its period of vegetation. If the shifting be postponed until October, the roots will then be in activity.

You may now have in bloom some of the Rose tribe, the Euphorbia splendens, Eranthemum, Fuchsia, that brilliant beauty the Euphorbia Jacquiniflora, and many of the tropical Orchidaceous plants, of which there is such a number of varieties. These indeed require, if

* Bear in mind, that all greenhouse plants, properly so called, may be kept equally well under the common garden frames.

possible, a separate stovehouse, a greater degree of warm *moisture* being essential to their full development, than to the ordinary collection of plants. Pelargoniums, Calceolarias, Verbenas, Cinerarias, may be associated together, for their habits are similar; they require more heat than the woody plants, but where separate compartments cannot be provided they should be kept at the warmest end.

A great point at this season is to prevent the premature growth of those plants which ought not to flower until an advanced period of the spring; and this may be effected by removing them, when they manifest the unwished-for symptoms of vegetation, to cooler stations in the greenhouse if there be a stove in it, or to cold frames, and those which are growing should be placed in the front of the greenhouse, to have the greatest portion of light and the warmest temperature; but after all, the nature or habit of the plant must be alone consulted, and if it have a decided tendency to shoot out, that tendency will not be easily checked, nor ought it to be in general.

Bulbs and tubers which have not yet pushed out, and have not been potted (for in this case it would be injudicious to disturb their roots), may be forced in pits with bottom heat, and seeds of stove plants may also be sown in these pots, with soil composed of sand and peat, or heath mould, and those of heaths and woody half-hardy plants may be sown, and also of the Rhododendrum and Azalea; but if hot-beds or stoves be wanting, this season will be too early for such sowings.

Besides the few fine flowers which have been enumerated in bloom, the Chrysanthemums may be yet lingering in flower, and Ericas, Polygalas, Coreas, the Ceanothus azureus, and the beautiful Chinese Primrose, will display their floral treasures in some portion of this month.

The Hyacinth, Narcissus, and early Tulip, not for-

getting Mignonette, will also be among the productions of this month. Almost every one knows that the Hyacinth and Narcissus grow freely in water, without any earth whatever, in a warm room. They are frequently in the drawing-room at this time in glasses, and they are living witnesses that the presence of earth is unnecessary for plants of their nature, which have extraordinary powers of absorbing moisture; whilst their bulbs constitute a temporary store of food for the development of leaves and blossoms.

Auriculas of a choice kind should be carefully attended to, and placed in the front of the greenhouse, or if under garden frames freely supplied with fresh air every fine day, but preserved from damp air, which injures the leaf, and consequently the whole plant. It is hardly necessary to add, that when the leaves of any plants—not seasonably losing them—present a yellowish hue, there is necessity for fresh air, light, watering, or some change of treatment.

Last year's seedlings of many of the stove plants may now be forced forward, and planted out in May in cold frames or protected beds, where they may acquire sufficient hardihood, a mode of treatment which advances them to their flowering period, though otherwise and naturally they would not flower until the third year.

A great variety of plants may now indeed be forced, and it is one of the gardener's chief delights to anticipate nature, in the development of flowers at a season when her appearance in the open garden is so cheerless. To foreign and very distant lands we are indebted for the more delicate winter bloom which delights us; and it is one of the most interesting facts in vegetable physiology, that plants brought from climates where the summers are our winters (to take the most extreme case), blow at their own proper season; they will naturally be true to their time of blowing,

if secured, as in the greenhouse, from the chilling influence of ungenial frosts or cutting winds; their natural habits are not altered by change of climate, yet a peculiar artificial treatment has been lately found to effect a change of the law of nature in this particular respect, and in a particular plant Mr. Loose, a florist at Ghent, has forced sixty out of eighty lilies to flower, at any season *after* fifteen days' management. Warm moisture increased to a certain temperature was his great agent, but he accelerated the development of their fructification and the opening of their corollas by dividing their leaves.*

If plants brought from distant latitudes were only to blow in our spring and summer seasons, how comparatively dull would be our greenhouses and conservatories in the winter!

Open Ground.—Though the out-of-door work be often interrupted by frost and rain, there will always be something to keep you employed. Manure can be wheeled out to the squares and borders, if this work has not been already executed at an earlier period, to be dug into the ground, which you can cover with litter or a thick coat of leaves, if there be reason to apprehend a hard and continued frost, so that the spade work may go on. Artichokes should be carefully protected by half-rotted litter during frost, but not to such an extent as would occasion, by fermentation of the materials, any degree of excitement in the plants. Celery should be protected by dry turf or clean straw, or better still by thatched hurdles.

When neatness of appearance is the only relief to the dreariness which prevails out of doors, it is especially desirable that the walks of the garden should not be cut up by wheels, nor dirtied by litter or manure. The materials for composts, &c. therefore should be ac-

* Annals of the Royal Society of Horticulture, April 1844.

cumulated on their proper places, when the impressions of wheels will be but slight. You will also find employment now in pruning gooseberry and currant trees, and trimming hedges.

The operation of *trenching* too should be one of your principal objects now. The method of performing it is this: Line off a strip about three feet wide, and dig or pick out the earth to the required depth, throwing it aside for the present; then mark off a parallel strip of the same width, and if you want to reverse the relative position of the strata, and to blend them, as in the case of old worn-out beds, dig off the surface and lay it at the bottom of the first trench, following on, spit after spit, until you sink to the required depth. This is easily done if you only wish to reverse the situations of the different layers, but as it is more usually necessary to mix the strata together, the manner of conducting the work is not exactly the same; in the latter case, there is a peculiar sleight which practice alone can teach, and which is not easily explained on paper. A gentleman* who observed the process in Flanders describes it nearly thus: The labourer, standing in the trench, with his left hand at the lower part of the handle (which is two feet long), and his right at the top, by the weight of his body and without the assistance of the foot—if the subsoil be sufficiently loose—sinks the spade about eighteen inches, and standing sideways throws off the earth with a turn of the wrist, so as to lay it in an oblique position in the trench, but breasting the preceding work; moving backwards and using his spade as I have stated, he mixes the strata in some measure, though the layers are regularly reversed.

The advantage of loosening and working deep and

* The late Rev. Thos. Radcliff, Sec. to the Farming Society of Ireland, &c.

mellow loam to its full depth, is evident to any one who has noticed the tendency of the fibres of plants to push downwards into the soil in search of nourishment, as in the case of the potatoe, whose fibres have been traced to the depth of four feet; but in a shallow and poor soil the propriety of deep trenching all at once is disputable; there can be no doubt, however, that by gradual and successive deepening of the soil by trenching, so as to bring up only a small portion of the under stratum to the surface, a very inferior soil may be rendered sufficiently good for the garden if fertilizing matter be properly incorporated with it: the advantage of trenching has indeed been fully tested in the poorest soils. As a preparation for celery, all tap-rooted vegetables, fruit-trees, and most evergreens, trenching is indispensable; it ought in fact to be the preliminary work in the arrangement of a garden, at least in particular sections of it, for such as the above productions.

Dig now every vacant spot that does not require trenching in a rough way, especially if the soil be strong and stiff. The squares which were ridged up in the preceding months, will now become somewhat mellow and pliable from frost, which is more powerful in reducing the earth to minute particles than any implement of human contrivance; but while it is an agent of good, it is also productive of much injury, if the gardener be negligent in using the proper precautions. The Almighty, who has given a time to every purpose under the Heaven—"a time to plant, and a time to pluck up that which is planted,"—has wisely ordered it, that in winter trees should generally have their buds so hard as to withstand the influence of frost, and that but few flowers should appear unless under protection; it is in spring and autumn, when hoar frosts come on, that vegetation suffers most severely. Place mats over your frames, and fresh horse

ding round your tender plants to impart warmth to them, and some awning across hoops over your ranunculus beds, &c. and any of the bulbs above ground or coming up, or else lay straw over them, while there is any danger from frost. It may not be amiss to mention also, that it is better to cover the plants which you want to protect loosely than closely—compression is bad, because the conducting power of bodies (as to heat) is according to their thickness. The greatest conductors of heat are metals, and the least so spongy and light filamentous bodies, such as silk, cotton, wool, &c.; and it is on this account that such materials constitute warm clothing—they give us a sensation of warmth not by communicating heat to the skin, but by preventing its escape into the air in consequence of their non-conducting properties, when the air is expelled by compression their conducting power is increased;* therefore, as Mr. Loudon has inferred, “in covering plants or plant structures with leaves, litter, straw mats, or other light porous bodies, the less they are compressed the more effectual will they be found in preventing the escape of heat. All tight coverings, whether of animals or plants, retain very little heat when compared with loose coverings, and hence mats when drawn tightly round bushes, or nailed closely against trees or walls, are much less effective than when fastened over them loosely, and do not retain nearly so much heat as a covering of straw; coverings of sand, ashes, or rotten tan, applied to the ground, or to the roots of herbaceous plants, are for the same reason much less effective than coverings of leaves so applied, and these again are much less so than coverings of litter or long straw.” It is necessary to observe, that rotten tan should not be generally employed for the purpose of

* See the article Heat, in the Library for the Diffusion of Useful Knowledge.

protection, for fungi, which breed in it, attack the roots of plants about which it is placed.

That the sudden and violent escape of heat is the cause of the injuries we witness, is plain to any one who notices the rapidity with which leaves and stems are destroyed in a hoar frost, when the sun causes the congealed moisture to liquify; by the process of the evaporation of its heat from its leaves and stem the tender plant is killed—*burnt* in the familiar phrase, which is quite correct in itself—inasmuch as a frost-bite and a burn produce the same violent effect on animals and plants. If celery be decidedly frozen it rots after the first thaw, unless it be taken up with large balls of earth, and placed upright on the ground under a roof with dry clean straw between the rows so as to prevent the heads from touching.

The Creator gives the most ready and universal covering when he bountifully lets falls a fleecy coverlid of snow, which is so porous as to contain a great deal of air; with this warm defence against the force of congelation, the common Hepatica, the Scotch crocus, and the snow-drop, vegetate freely, and burst into bloom, the harbingers of spring, when all around is deadness and gloom. The great danger from frost, I repeat, is not in this season, but when buds are opening in the spring, and vegetation is luxuriant in the autumn, when it is impossible to guard against it: the only remedy is to brush off the frost early in the morning, before evaporation takes place. It is from the foregoing principles that we understand why plants exposed to a northern aspect escape the effects of frost, when others with a sunny aspect are injured.

Harsh chilling wind, such as visits us so generally in the spring from the east,* has also immense influ-

* Some accurate observations of Mr. Thompson through a course of nine years, quoted by Professor Lindley, show that the

ence in causing evaporation. The late Professor Daniell calculated, that the same surface which in a calm time will exhale 100 parts of moisture, will with a moderate breeze exhale 125, and with a high wind 150 parts. When the air is chilled during the prevalence of a north-east wind in spring, the sap vessels of plants become contracted by its withering influence, and the circulation of the fluid is arrested; the blossoms of our fruit trees already deprived of their fluids by evaporation perish.

If rain falls heavily this month, you will find employment—besides attending to your plants—in the greenhouse, repairing implements, mats, nets, tying straw hurdles, preparing labels and stakes, examining dried roots and fruit, and sorting bulbs that are unplanted, and making every preparation that the season will allow for future work.

You may sow French beans in pots under frames with mild bottom heat, as also salad herbs, radishes, potatoes, and celery and cauliflower seeds. And put strawberry plants also in pots or boxes, under the frames, or in a cool greenhouse if you want them later. The finished gardener, who has every convenience of houses, glass, fire, manure, &c. will find it necessary to have the earliest productions at his master's table, or in the market for his own benefit, as the case may be; but the humbler practitioner, with limited means and assistance, will act more prudently in not expending labour, manure, and seed, in what would probably prove to be ineffectual efforts to anticipate the regular seasons.

The frame and Bishop's pea, and Mazagan bean, and

greatest dryness, measured by an hydrometer, has been experienced with a south wind, which blew during four days in June 1834. There was only one day in those nine years, in which the dryness reached the same degree from a north, east, or west wind.

also some of the larger kinds, should be sown in warm quarters, and even radishes and carrots, in open ground with some means of protection in case of frost. Mushroom beds, made in one of the previous months, will require in wet weather protection by some sort of covering to keep them in a dry and warm state. There can be no real difficulty in having mushrooms all the year round; I shall, however, reserve the directions respecting their formation until I come to one of the concluding months.

Melon and cucumber beds are now to be made. Prepare a hotbed thus; Take of fresh horse-litter dung as much as you may require, to the place where the bed is to be made, and shake it very carefully with a prong that the straw may be separated, and yet the whole mass blended together into a heap, somewhat more pointed than one of those little haystacks known by the name of hobblers, the summit being crowned with the short dung which fell in the shaking, and which should be carefully shovelled up. Mr. Cobbett, who was a capital gardener, recommends* that this heap should be turned over and shaken to pieces, and remade three times in nine days; and he considers that three such previous fermentations are sufficient; and that without this, the heat of the bed (unless the dung be very short at the beginning) will not be lasting nor regular, and that the bed itself would not be solid nor uniform.

Mr. Loudon considered, that it generally requires to lie a month in a heap (turned three times), before it is fit for a common hotbed. The state of the weather, however, must be considered, for in hard frosts or chilling rains the tendency to fermentation is very much lessened;† while in warm weather it is greatly increased. Whatever be the previous circumstances,

* In his English Gardener.

† It is therefore desirable to have the dung under a shed.

the fiery heat must be got rid of before the hotbed is formed. Tan and leaves are often mixed with dung, in order to afford a more durable and milder heat, but not usually for cucumbers or melons.* If made in the winter or early spring, the height of the hotbed should be from five to six feet, at first, and the width about a foot more on all sides than the frame intended to be placed upon it. The frames and glasses are to be put on immediately after the bed is completed, and when the heat begins to rise admit some air; in about three days the heat ought to be full; this you will ascertain according to Mr. Cobbett's simple plan, "by poking your fore-finger into the centre of the top of it," as a thermometer, which you should apply morning and evening from the first day. You will find the heat increase until you cannot endure it for a moment; when it moderates so that your finger can easily bear it, lay on finely-sifted earth to the depth of six inches. If you apply the earth during the great fermentation, it will be so dried up as to be unfit for the reception of seed. I have put moss and peat earth over the dung to absorb the acid vapours that otherwise would injure the plants, and in such case given a thinner covering of the sifted mould.

The contrivance of Mr. M'Phail, for rendering the fermenting dung available to the heating of earth inclosed in a hotbed or pit, so that the seeds may be sown at once, is very ingenious; because it may be made the means of imparting warmth at the same time to vines on a trellis, as well as to melons, &c. at a few inches from the glass: his method is to admit the heat

* The hotbed suited to melons would be much too warm for radishes and such half-hardy vegetables; a much shallower bed as well as cooler is required for them; and they will do very well without a glass frame—oiled calico or paper will prove a sufficient shelter for that. Even a covering of mats at night will answer the purpose.

from the fermenting matter without, through thin brick-work perforated with small holes. The heat enters into a bed of leaves, inside which pine apples melons, &c., &c. and flowers, may be grown; but as such constructions are expensive in the first instance, and the supply of dung required for linings to produce the necessary heat is considerable, it is questionable whether there be much economy in the method. The amateur, however, who can afford such expense, will find it effective.

The mode of heating the pits by hot water conveyed through pipes or flues, used by the late Mr. Knight for his Persian melons (which are far more tender than the cantaloup kind), is well known to the metropolitan horticulturists, and is such that, while it answers in the upper part for melons and cucumbers, it enables the gardener at the same time to force seakale, &c. &c.

The cantaloup melons, of which there are many varieties, the rock, the Dutch, and the early cantaloup—all of which are red* in the flesh—being among the most approved, are easily raised under glass in our country, though it is a native of the climates of the east, and has long been naturalized in Italy.

I shall extract in a condensed form, and omitting what is not to the point in this month, the directions for the culture of the cantaloup from an article in the Penny Cyclopædia, which in a short compass furnishes the most complete information respecting it:—

“About four months may be allowed, on an average, for the period between the sowing of melons and the ripening of the fruit. The middle of January is found to be early enough to sow; and the young plants are so exceedingly tender, that accidents are then very likely to occur to them. It is on this account necessary to make successive sowings, in order to be pre-

* The green-fleshed melons of small size are also excellent.

pared for replacement, if requisite, and also for continuing the supply throughout the summer. A sowing for the latest crops will be required in April. The seeds are sown in pans or in small pots, and transplanted into other small pots, when their seed-leaves are about half an inch broad. It is best to put only a single transplanted melon into each pot. While this is done in a separate frame, that which is intended for their future growth and fruiting is prepared for their reception, by placing small hills, rather more than a foot high, of light rich mould below each sash, and nearer to the back of the frame than the front. Care must be taken that this mould be of the proper temperature before the young plants are introduced, which is to take place when they have made a few rough leaves. As the roots extend, more soil should be added of a gradually stronger nature; and ultimately the roots should have a depth of about fifteen inches of such soil. The soil should never be introduced in a cold state; and if there be no means for previously bringing it to the temperature of at least 70° , it should be put into the frame in small quantities. When water is required, it should never be much below the above-mentioned temperature, nor should it exceed 78° . It should not be applied when the air of the frame is at a high temperature from sun heat. Shading is necessary immediately after watering, when the sun's rays have any great degree of power; unless this precaution is attended to, scorching will be induced, and the red spider will be likely to attack the foliage." When the season comes for after management, I shall conclude these remarks.

You have seen from the above that a second bed is necessary for the raising from seeds, if there be not some house in which a temperature of from 70° to 80° is maintained. Other modes of propagation shall be noticed in their due course.

The treatment for early Cucumbers.—There is some difference of opinion whether it is better to raise them from seedlings or cuttings at this season of the year. There is a great deal asserted in favour of propagation by cuttings, which are said to be less liable to suffer from cold atmosphere, in consequence of being less succulent, and that they bear immediately after they have formed roots sufficient to nourish the fruit, and are more productive than seedlings.

If you raise from seed, make a small hotbed in the commencement of this month, if you have not done so in December, under a single glass frame as directed before, and when the temperature is at the proper point, lay the leaf-mould or a mixture of it with peat over the bed, and sow the seeds in it broadcast, or in drills half an inch deep; press the earth gently over them afterwards, admit as much fresh air as the state of the weather will safely allow, to carry off the noxious steam which arises. Cover the frames securely during frost and snow, but take care to give vent to the pent-up air, whenever opportunity allows.

You may put the seeds, when the rough leaves appear, which on an average will be in a week, in pots "about five inches deep, six inches over at the top, and four inches over at the bottom, measuring from outside to outside; put a small oyster shell, the hollow part downwards over the hole at the bottom of the pot. Fill the pots about three parts full of earth, raise the plants out of the ground with your fingers, put two plants into each pot; holding the head of each towards the rim, while you put in more earth with the other hand to fill the pot up to the rim. Then take the pot and gently rap the bottom of it upon the edge of the frame three or four times, which will leave the earth about half an inch below the rim. You may then press the root of each plant a little with the point of your finger, and put on a little more earth to make

all smooth. Observe that the shanks of the plants are to go so deeply down into the pot as to leave the seed-leaves but a very little above the level of the earth in the pot. The earth will come out of the heap to fill the pots with; and a very small part of it will suffice. You will now draw the *earth* from the *sides* of the frame towards the middle of the bed, and having formed it into a broader heap than before put the pots down into the mould up to the rim, taking care that they stand perfectly level, and taking care also the tops of the plants do not stand too far from the glass; for that would cause them to be drawn up and be made weak. About six inches from the glass is quite enough. I am supposing that your first cucumber bed, for the producing of fruit, is to have four lights. You will therefore want but four pots of plants, but it will be better to have double the number; the super-numeraries cost nothing, and they may save a neighbour the trouble of making a seed bed.”*

Having thus put the plants safely to bed, I must leave them there for the present, and go on with the remaining operations of the month, merely remarking on the general subject at present, that for both melons and cucumbers a lining of fermenting dung will be required if the internal heat has subsided too much, but a lower degree of temperature as well as a lighter soil will answer for cucumbers than is requisite for melons.

Seakale is one of the delicacies of this month, and may be regularly forced and blanched until the natural season arrives, by placing over the plants (around which coal ashes, tan, or sand, has been previously put) forcing pots covered up with fermenting stable dung, which should be renewed when necessary; or putting plants in boxes or pots into a dark cellar

Rhubarb is forced in the same manner, either in the dark or in light, according as it is preferred to be somewhat blanched, or of the natural colour. Keep the crowns of both perfectly free, else their growth will be materially checked. Supplies from either of these plants and of asparagus may be easily obtained, by transferring them to a slight hotbed, but in the case of seakale light should be excluded, in order that it be blanched. Chicory and endive, which have been previously blanched by tying up the leaves in bass mats and earthing them up within a few inches of the top, may be kept like celery on a floor, if they be taken up with balls of earth and placed upright with straw between the rows.

Successions of Marshall's dwarf prolific and the frame pea, and the mazagan bean, now sown, will probably come into bearing as soon as those sown in the two preceding months, unless these have been greatly favoured by circumstances. If there be houses or frames there is no difficulty in raising early peas, by sowing them in shallow pots or boxes under glass, until the time comes for transferring them with balls of earth into the open garden. To avoid any disturbance of the roots, they may be sown in pieces of turf, slit lengthways for the purpose, and laid in the greenhouse or under a frame until spring. In some gardens there are permanent beds for them, between slight brick walls three feet high, which are effectual security from frost or nipping winds when covered with boards overhead. Coal ashes or some other absorbing substances are placed below, unless in some very open soil, to prevent water from resting there. In the absence of such defence, a little moveable roof may be easily made with laths or wattles, over which mats may be thrown when necessary; indeed this inexpensive and ready kind of machinery will be found useful for many purposes, for instance, protecting early potatoes. Mice

may be kept off from peas and beans by scattering chopped furze, or the awns of barley, &c. over the drills, and setting traps; slugs which make such sad havoc among peas and beans, may be caught by strewing young tender cabbage leaves along the drills; the slugs feed greedily on the leaves and may be seized in the act of depredations in large numbers, and as a just punishment for their gluttony they may be thrown to ducks. Those which attack salading must be destroyed by solutions of lime or salt.

Though potatoes ought to have been planted in November for a *very* early dish, do not omit to put down some for successions in the beginning of this month. Prepare drills, running north and south, and dig half-rotted stable dung into them: cover this by raking in from the sides as much earth as will raise the drills to within four inches of the surface, then lay whole sets ten inches apart,* and cover them lightly at first, but afterwards occasionally add sifted ashes. Until the roots are well up, long straw thrown across from ridge to ridge will be a sufficient protection from frost; afterwards hoops or some sort of rude framework may be necessary to support the covering material, and prevent its pressure on the tender stems. It is important to have a dry bottom at this season for potatoes; if it be otherwise, the better mode will be to lay the sets on raised beds (manured), and to cover the sets with mould from the sides or alleys.

The Ash-leaved potatoe, which does not blossom, is one of the earliest varieties. Abercrombie describes a method which is very successful:—"For a fair crop

* Many persons prefer cut sets; in this case, the crown eyes, with a considerable portion of tuber attached, had better be planted together (the eyes uppermost), and the next sections in one or two drills; and, as the eyes nearest the lowest extremity ripen last, they are rejected by those who are anxious to obtain the earliest crops.

of tubers, which shall be somewhat dry and floury, and of the size of a hen's egg, plant sets of the Ash-leaved variety in single pots, filled one-third part with light earth, in January. Place them in a hot-house or hot-bed; earth them up as they appear, and about the middle or end of February, transplant them with their balls entire into a bed prepared as for asparagus—distance from plant to plant one foot each way. Give water occasionally, and admit as much air as possible at all times. Potatoes so managed will produce a crop at the end of March or beginning of April." Old hotbeds answer well for potatoes, which do not bear forcing by a high temperature.

FEBRUARY.

Store and Greenhouse.—Be still attentive to remove dead leaves from the plants, to keep the earth in the pots in a loose state, and to admit fresh air when the weather permits. The potted plants that are still in a dormant state and have been kept dry during the winter, may towards the time of their removal be plunged to a considerable depth in water of about 60°, in order thoroughly to moisten the mould around them, as a preparation for regular watering. Syringing the leaves of other plants and sprinkling water on the alleys are found useful in producing atmospheric humidity in climates where the external air is very cold and dry—moisture with heat being, as already mentioned, the most favourable combinations for promoting vegetation.

The woody plants in the greenhouse that are in a state of torpor, except when the mould is in a state of dust and the leaves are withering, should not be yet encouraged to grow, by heat or watering. Pelargoniums however will be now exhibiting symptoms of life, and will require repotting with fresh mould, and in some cases to be transferred to larger pots. In doing

this, shake the earth almost entirely from the roots, and remove the dead fibres from the roots with the finger, avoiding to use the knife unless it be to trim with a tender hand dead or decayed roots. Stake the stems and tie them to the sticks, which ought to be taller than the plants, with soft and flexible bands of rushes, strips of matting, or worsted, &c.

There is no part of the gardener's employment more delightful than that of anticipating the season of vegetation at this time, and enlivening the gloom of a dreary period by calling forth the freshness and bloom of the many flowers which will now begin to expand their corollas. Varieties of the Double Almond, with the Rhodora, and some other plants, appear now before their leaves push forth, and artificial warmth will bring forward many beautiful plants, such as the *Acacia* of St. Helena; but as the enumeration of them and of others in their respective months would extend this little book far beyond its prescribed limits, I shall not furnish lists of mere names,—you must consult the *Gardeners' Chronicle*, or other standard publications, which contain calendars, and the names of productions, if your own information be limited.

Roses and other hardy plants, brought into the stove-house for forwarding, are liable to the attacks of the green fly called the *Aphis*; if you are fond of a pipe or cigar, you may perhaps smoke* this insect out; in this way tobacco† smoking may be turned to a useful purpose, which cannot be said of the practice in general.

* A correspondent of the *Gardeners' Chronicle* mentions, that having casually put a titmouse into his greenhouse, he found that this little operative cleared all his plants of insects, which had crowded among his *Cinerarias* in particular, from which he had found it most difficult to dislodge them.

† Scattering pungent snuff on the plants is another and perhaps more effectual remedy.

In the stovehouse, the bottom heat of the tan-pits must be sustained by forking up the bark (this at the beginning of the month, and occasionally afterwards if necessary), to give it time to ferment: the progress of choice flowers and fruits cannot be expected if the heat of the tan be not sustained.

You will now be busy in forcing strawberries, French beans, peas, carrots, potatoes, radishes, asparagus, sea-kale, &c. If the peas and beans sown last month under frames should now touch the glass, you can check their tendency to spindle, by turning their tops towards the back part (the north side) of the frame; if they be constrained in that position for a few days, by means of a lath or any other contrivance, they will afterwards, of themselves, take that direction, and branch out as desired.

Line such hotbeds as have cooled down, and make new ones for melon and cucumber plants, from the seed-bed. Cold beds will answer very well when redressed for the radishes, which do not grow well in the heat that is necessary for cucumbers, or for the reception of cauliflower-seedlings and salading, picked out from their native bed.

Cover all your glass-houses, if possible, and frames, completely with matting and straw during severe frost, and if you have a quantity of dry leaves, you will find them most serviceable as an exterior lining to keep off frost: by placing short stakes round the linings of dung or clay-mortar, as the case may be, you can prevent them from being moved by wind: filling the alleys between the beds of Anemones, &c., will be serviceable, as security from frost, but will not supersede the necessity of laying mats over the beds, while the frost is prevailing.

If you have not sown cucumbers in a bed made last month, do not delay to do so now, or else procure plants from gardeners who have sown at an earlier

period. The plants will be fit for putting into their bearing-bed when they have pushed two rough leaves, and began to exhibit the appearance of runners or shoots coming forth. Having made the new bed as before directed, cover it over to the depth of four inches with light rich mould, mixed with peat, raising a little mound under the centre of each light, and rather nearer the back than the front, and three or four bushels laid round the frame on the inside, all of which mould is to be stirred daily.* "Everything having been thus prepared, take four pots of the plants (those which appear to be the finest, of course), put the mould into a round heap under the middle of each light of the new bed; make a hole in the centre of the heap, suitable for your purpose; take the pots or plants, one at a time, put the fingers of one of your hands on the top of the earth of the pot, then turn the pot upside down, give the rim of it a little tap upon the edge of the frame, pushing the oyster shell with the forefinger of the right hand, and the plants and earth will come clean out of the pot in a connected ball, which with both hands you are to deposit in the hole which you have made in the heap, in the centre of the light. When you have thus deposited it, draw the earth of the heap well up about the ball, and press it a little with your fingers, taking care of two things—first, that the hole be sufficiently deep to admit the ball down into it, so low that the earth of the hill when drawn up about the plants may come up quite to the lower side of the stem of the seed-leaves; and secondly, taking care that the points of the leaves of the plants be not more than six inches distant from the glass."† One plant is enough to establish under each light, for crowding always defeats the object by causing a growth of small plants which are rendered

* See Cobbett's English Gardener.

† Ibid.

defective by the interference of the roots, and their perpetual struggles for advancement. Water these plants once or twice gently with rain or pond water warmed either by having been left for twenty-four hours in the frame, or by the adoption of a sufficient quantity of boiling water; and also those that are in pots sunk in any part of the bed, as a reserve for supplying any failures in the others. Next prepare a lining (which you will have to apply in about a fortnight) to the back, to the height of the frame, laying a board on it close against the frame to prevent the steam* which will soon arise from entering the bed, and another lining (if necessary) in a fortnight after to the front, and afterwards (allowing the same interval of time to intervene) to the sides. Keep up the linings as they sink by adding fresh materials to the top; litter, straw, or mats, will occasionally be required to guard against frost or east winds, especially at night, but fresh air must be admitted, more or less according to the state of the weather without, and the degree of heat within, by raising the frame either in front or behind (the direction of the wind being considered), for air as well as strong heat are indispensable to the health and fruitfulness of the cucumber, and light must never be intercepted. The runners are to be encouraged to cover the entire surface by *pinching* (for the finger and thumb should always be used for this operation in preference to the knife, which causes a wound), when they have got three joints from their tops, which makes them throw out side-shoots from each of those joints. When these new shoots or runners have four complete joints, pinch off the fifth as soon as it appears. By this treatment

* On the authority of the Gardeners' Chronicle, however, there will be no danger from the rank steam, as long as the condensed water on the sashes is of pure colour.

there will be a sufficient number of runners for each light. As the plants become vigorous they will require fresh mould, which is to be drawn from the sides of the frame to the mounds in the centre for the nourishment of the roots; and as their fibres will continually stretch out in search of food, you are to increase the circumference of those mounds continually, by removing the earth to them from the sides until the whole surface of the bed is on a level with the central parts. The blossoms must be impregnated, as will be noticed in the treatment of the melon.

Towards the end of the month make the first melon bed, as for cucumbers, except that the mould should be more tenacious, and the lights larger. One plant only should be put under each light, if the frame be of moderate size; but if two be planted, let them be fifteen inches apart lengthways with regard to the frame. If the Persian and Cabul kinds be chosen, the shoots will not require pinching like other varieties; the leading one is to be trained under the centre of the light, and the lateral ones on each side at right angles.* Generally, melons raised from seed should be stopped when they put off the rough leaves, and only one shoot should be allowed to run from the axil of each of the two rough leaves left on the plant; those which proceed from the axils of the cotyledon leaves being suppressed at their first appearance; and again when these two main runners have attained about two feet in length, in order to produce fruitful laterals,† for otherwise they become too much drawn and long jointed. Those that are from cuttings have far less vine, and do not require topping until they show fruit.

* Gardeners' Chronicle. Trellis work is often made use of when the melon pits are of great width, from which the vines or runners are trained from the front to the back, eighteen inches or two feet below the glass.

† Loudon.

When the melon is in flower, "watering over head must be dispensed with, and gentle vapour only occasionally raised to nourish the leaves, for it would be injurious to keep the flowers too moist at this time. Every female blossom must now be carefully impregnated, and as soon as the fruits are set and beginning to swell, plenty of moisture and a closer atmosphere will be of the greatest service till they are swelled full size, when moisture at the root and also vapour on the leaves must be finally dispensed with." These judicious observations from a correspondent of Mr. Loudon prove that the melon requires much careful treatment. The raising of cucumbers is much easier, but the great superiority of the other gives it a just claim to extreme care.*

The impregnation of the blossoms is effected by applying the pollen of one flower to the stigma of another, and this is done by pinching off one of the male flowers, and after carefully stripping it of its corolla, so as not to injure the stamen or anther, inserting it into the female flower, and leaving it there. The same plan must be adopted for cucumbers grown in frames at an early period of the year, on account of the little chance there is of plants so situated at such a season being casually impregnated by bees, &c.†

* Those gardeners who provide luxuries for the table, pot single plants to produce a single fruit for the stovehouse.

† "Plants agree with animals in having a sexual system, but they differ from animals in having, for the most part, both sexes in the same individual. In the improvement of plants, as in the improvement of animals, the sexual system is a powerful agent; and what is called cross breeding is employed with as great advantage in the vegetable as in the animal kingdom. It is remarkable that the general laws and results by which the process of cross breeding in both kingdoms is regulated, are the same; the two parents must be two varieties of the same, or nearly allied species, and their qualifications may be different but must not be opposite; the preponderating influence in point of character

You may sow cabbage seed, and likewise celery, in a mild heat. At the latter end of the month, supposing the weather favourable, you may pot the tender annuals that were sown a month or six weeks ago, putting three or four plants into each pot. Make cuttings of everything you want, and part roots, and make root cuttings of those plants which are so propagated. With respect to cuttings generally, I cannot forbear quoting the experience of that highly-gifted author and practitioner, Mr. Loudon, respecting the advantage of multiplying plants by their means, instead of by seedlings.

“In an atmosphere as above described, let the cutting-pots, prepared in the following manner, be placed half a day previous to their being used, in order that the mould may be warm, to prevent a check by cold soil, to the bottom of an exotic cutting. If provided

is also with the male, and in point of bulk and hardiness with the female. Many of the finest varieties of fruits, culinary vegetables, cereal grains, and grasses, have been produced by cross breeding. When cross breeding is effected between what are considered different species, the offspring is a mule or hybrid, which in some cases is incapable of maturing seeds, and generally, in the course of a few years, degenerates. There are instances of mules or true hybrids producing fertile seeds.”—*Loudon's Sub. Hort.*

“The effect (hybridizing) is produced by applying the pollen of one flower to the stigma of another. The pollen indicates the male parent, the stigma the female. In performing the operation, it is necessary to use these precautions:—The female flower must be deprived of her stamens, before they burst and disperse their pollen; and as soon as the stigma is glutinous enough to hold it fast, the pollen must be applied with care. Should this care not be taken, the stigma is very likely to be inoculated with the pollen of her own or some other flower, and the pollen which it is intended to use will not take; for it must be always borne in mind, that a stigma once inoculated cannot be inoculated again. From want of these precautions, people are continually fancying they have obtained hybrids, when they have only gained natural seedlings.”—*Gardeners' Chronicle.*

with a small crystal bell glass, or a small hand light, closely glazed, either of these may be used; but if provided with neither (which is nothing uncommon), you can doubtless command as much glass in square or fragment, as will cover the mouth of a 48-sized pot.

“The cuttings should be taken from the extremities of the healthiest vines, cut close below the third joint from the tip, and inserted in thumb-pots filled with leaf-soil and loam mixed, about half an inch below the surface of the soil; and these placed in the bottom of a 48-sized pot, and the cavity between the two pots stuffed with moist moss, and the glass laid over the top of the outer pot, which ought to be plunged in a hotbed to the brim.

“This is an improvement in striking cuttings which I have never made known before, nor have I ever seen it practised by any one else. It is a common way to fill a pot three-fourths full of soil, and in that to insert the cuttings under a pane of glass; and I have no doubt, when those that have practised that mode come to see this simple improvement, so much more workmanlike and applicable, not only to melon cuttings but to all sorts of cuttings—exotic, greenhouse, and hardy, they will feel nowise reluctant to relinquish the old way.

“The advantages of this mode are, when the cuttings get up to the glass, which they generally do before they have struck root, the outer pot can be changed for one a little deeper, and the moist moss serves the twofold purpose of conducting heat and moisture; and as the heat of the tan or dung-pit will be 30° or 40° above that of the atmosphere of the house or pit (a good tan-bed will range about 110° at six inches deep), it will be communicated through the outer pot to the atmosphere around the cuttings, thereby accelerating their striking root. This high atmospheric heat is an

advantage possessed in common with the old system over the bell-glass propagating pot."

Dahlias may be put into hotbeds during any part of the month, to make them push. The seeds of Dahlia, Calceolaria, Polyanthus, and of various annual flowers and kitchen vegetables, may now be sown in mild hotbeds under frames. Peat or heath mould is the best covering for Calceolarias, and when they have put out two leaves, they should be pricked out into two-inch pots, filled with good mould, and transferred to four-inch pots when their tissue has overspread the sides. Sow successions of celery and cauliflower in cool beds, and after three weeks the seedlings will be fit for pricking out into fresh ones.

Pot all the autumn propagated plants in framed pits, so as to have them well-rooted and turned out in April, in order that the pots may be disengaged for a new succession of plants, which ought at this time to be making progress in a propagating frame.

Open Ground.—Keep the Auriculas free from insects and diseased leaves, and replace the old mould at the surface with fresh; and if you have any under common garden frames, be most particular to give them air. When the trusses are rising to the heart, earth up the stems of Polyanthus with fresh compost, and as Tulips appear above ground cover them up well with sand, which is some security against frost, and otherwise serviceable to them. Plant out Anemones and Ranunculuses in drills seven inches apart and four inches between the plants, which you should put in with a trowel; and if frost have pulverized the earth, so much the better.

The middle of this month is the best time for providing scions for grafting rose-trees and fruit-trees next month; these should be selected with judgment as to the sorts, and pruned off, where they can best be afforded, in lengths of from two to three inches, sepa-

rated and labelled. When you have arranged a sufficient number, and rubbed off the buds, stick the thickest ends into moist clay, closely pressed round them, and then put them thus clotted into a pot of earth, in which they may remain under some shed until wanted. At the close of this or the commencement of the next month, time, which will be more precious then than now, may be saved by this timely preparation of scions, where much of this nursery work is to be performed, and you will thus have the scions in the best order for grafting, for this treatment will test their vigour: those that shrink and become feeble, you will reject out of the number prepared, which should considerably exceed the number actually required. Provide stocks, if you have not already done so, for grafting and budding during the ensuing season.

In the *Kitchen garden*, pursue the works of digging, trenching, turning composts, &c., in open weather; and in allotting portions of ground for particular seeds or plants, endeavour to change the crops as much as possible, because, by the frequent recurrence of the same in any given spot, they degenerate (generally speaking), and by depriving the soil of peculiar alimentary substances, or by making frequent deposits of the same kind of excretion, they render that soil indisposed to their individual support,* though fertile for other families of plants. Another cause why the culture of a particular tribe without variation should be discontinued in the same ground is, the *mechanical* effect which it may produce on its soil, by rendering it, for instance, excessively friable, or the contrary. No annual vegetables ought, prudently, to succeed each other; vary them therefore as much as you can.

* Causing, of course, a necessity for more manure than would be otherwise necessary: and this consideration alone is sufficient to render the gardener, who finds such unceasing want of it, economical in its distribution.

You will find that celery gives a good preparation for carrots, turnips, parsnips, onions, and early cauliflowers, or for peas with potatoes and winter greens or brocoli between the rows. Autumn sown onions may be succeeded by spinach, lettuce, &c., and early cauliflowers by autumn onions. Spring sown onions will be advantageously succeeded by cabbages in beds, with scarlet runners between; and if the cabbages stand all summer and next winter the ground will come in, in the spring, along with brocoli ground for celery, potatoes and peas—the peas sown on the ridges.

During rain you can find employment, besides what the stovehouses and conservatories afford, in making and repairing mats and straw covers, shades for Dahlias, preparing stakes, cutting shreds, making paper bags for the bulbs of next year, &c. &c.

If the season be mild you may sow, towards the close of the month, a great variety of seeds in the open air, but do not be tempted to sow by a *pet* day, which may be succeeded by a deluge of rain and heavy frost. If however seeds and labour are of no great value to you, there can be no objection to your adventuring a little in warm borders, for the sake of obtaining early productions—Carrots for instance: but be prudent in this particular. Kidney-beans are so delicate, that there is no use in sowing them yet out of doors, at least without some artificial protection. Peas and beans should be sown for succession, and salading and early cabbages should be planted out, as well as rocambole (Spanish shallot) and Jerusalem artichokes. Seakale may now be abundantly forced in the open garden with litter and pots. Protect the wall fruit-trees that are in blossom from frost by light matting, thin canvas, or (as Abercrombie recommends) by interweaving through the branches boughs of evergreens from time to time.

MARCH.

Storms from the south-west, or cutting blasts from the east, accompanied with sleet or penetrating rain, may now be expected; therefore, though the sun may shine brightly and warmly at intervals, do not indulge the delusive hope that fires and matting may be dispensed with for your glass-houses and frames: do not relax your vigilance, for you will probably have many severe days to contend with yet.

Stove and Greenhouse.—Put cuttings and seedlings of the tender and choice annuals sown last month into thumb-pots, from which they are to be shifted at a more advanced stage, and shift all plants that require repotting (leaving the most forward to the end of this or until the succeeding month), and make cuttings of Hydrangias and Fuchsias, and keep up a moist temperature of about 70° for a few days, until the repotted plants acquire new roots in the fresh mould, and the cuttings strike theirs in a mild bottom heat. For almost all the plants the mould may be composed of rich maiden earth (rotten turf preferable to any other), leaf mould and sand in about equal proportions; and for the lower stratum in the pots charcoal is excellent, for it acts as a drain below, and if a charred stick be placed vertically in a pot, it becomes a conductor of moisture to the roots of the plant, which, without some such management, are so frequently in dry earth. Ground bones mixed with the charcoal have a permanently good effect. The depth of these porous substances should be a third of the whole filling for very delicate plants, such as heaths, and indeed for cuttings of almost all house plants.*

* The Gardeners' Chronicle recommends, for nine young plants out of ten, one-third peat, one-third leaf mould, and the remaining third of loam and sand; and for Heaths and Epacrises,

The temperature of the greenhouse should be much lower, though not below 40° during any part of the month, and fires will be unnecessary as the month advances. The flowering plants should not be crowded or left unventilated, but the more or less frequent admission of fresh air will depend very much on the size of the house and the number of plants; in a small and full house the necessity for admitting fresh air will be more urgent than under opposite circumstances. Plants that have ceased flowering should be removed from the greenhouse to the conservatory or garden frames, to make way for others about to blow.

Mr. Barnes, gardener to Lady Rolle, in Devonshire, has been in the habit of using fragments of charcoal of different sizes with unsifted fibry soil and pebbles, in pot culture of every description for upwards of twenty years, and with the most beneficial effects. He was led to use it from seeing the luxuriance of grass and weeds in a wood where the charcoal dust had got among them. He tried it first with cucumbers, and then with other soft growing plants, and most kitchen garden plants in drills.* Whether the mould should be unsifted and therefore rough, or fine, should depend, however, on the nature of the plants for which it is intended. The editor of the *Gardeners' Chronicle* lays down as a rule, that soft-wooded plants, such as Fuchsias and some of the *Clerodendrons*, should be quite fine, (he assumes that they are to be first put into small pots and to be shifted into larger,) in order to let the roots occupy every particle of it in

and such like, sandy peat alone; and for Chinese Azaleas, a large proportion of leaf mould.

The writer of this Guide has used with success for Tulips and *Ranunculuses*, three parts of fresh turf mould, one of leaf mould, and one of cow dung; and for *Anemones*, a greater proportion of leaf mould, and less of earth.

* See *Gardener's Mag.*, Nov. 1842.

a few months. The compost for permanent woody plants, on the contrary, should be very rough.

Observe the directions for the preceding month respecting Auriculas. If they be under frames, open the sashes every fine day, keep them warm at night, water very moderately until they have opened their flowers, when even a soft shower would be injurious to them, and shade them from much light to prevent their trusses from being drawn: those (of a choice kind) which produce two hearts should be deprived of the weaker, and no buds except those in the centre should be left: a very brilliant sun injures Polyanthuses in blow by blanching the edges of the flower—protect them also.

Fine Carnations that have been under frames should be put into nine or ten-inch pots, or, if their roots be not much matted, into smaller ones, from which they should be afterwards shifted; when potting them, take care that no wire worm slips through your fingers in the compost, every particle of which ought to be narrowly examined;* press the balls round their roots gently, so as to fix them firmly in the pots.

Continue to force fruits, choice vegetables, and roses, &c.

Frames.—In the early melon pit, the flowers may now require to be impregnated: the plants put out last month ought to be well rooted the middle of this month; draw earth to the roots if they require it.

Give the same care to cucumbers as to ventilation, watering, and lining, and make fresh beds for later crops.—Protect all your potted plants and cuttings in frames, and give air to them when you can.

Sow seeds of Dahlias; prick out two inches apart

* If two layers be put into the same pot, place a slice of potatoe between them, to have a chance of saving them from any wire worm that may have escaped your detection.
Gardener's Chron.

those that were sown last month, pot rooted cuttings of them under frames, and lay the tubers that are to be planted out next month into hotbeds to make them push.

Flower Garden.—Guard Tulips and Ranunculuses from heavy rains and frost; the latter swell after much rain, and frost succeeding injures them extremely. A top dressing of rotten compost at the commencement of the month will be serviceable to Pansies. Fork and dress all flower-beds and borders, taking care not to loosen the roots of the plants, and scatter lime, salt, or soot, to destroy snails and grubs, which will however be more effectively destroyed by the activity of a sea gull with clipped wings, which may be encouraged to roam about the garden at pleasure.

Transplant annuals and biennials sown last autumn.

Kitchen Garden.—Seakale is now abundant for the table, by merely taking the trouble of blanching the shoots, and covering the crowns with sifted coal ashes, sand, peat, mould, or tan; fresh sowings or plantations of it will, however, be always necessary at this season, to keep up successions of plants, if they be wanted for forcing in the early part of winter; if yearling plants are used instead of seed (which is, however, more certain of success, the best plants being those which grow without removal from the places where the seed was dropped), a year is gained: for the same purpose, roots of rhubarb may now be parted, and put into fresh plantations. Asparagus and Elford's scarlet stalked rhubarb (the former much more so), if wanted for the table early, must be forced by a heavy covering of fermenting litter over the beds, or by digging trenches between them as wide as the breadth of the alleys will allow, two and a half or three feet deep, and filling them up with litter, of which some should also be laid on hoops over the beds. When you have

obtained and cut the crop, remove the litter from the trenches, and fill them with rich mould, into which the fibres of the asparagus may strike freely. The disadvantage of forcing asparagus severely is, that it will not bear a repetition of the same treatment for three years—a serious matter with a vegetable which cannot bear forcing at all until it is four years' old, double the age sufficient for seakale and rhubarb raised from seed.

A rich, deep, and sandy loam is the most suitable for those three valuable plants, and if the soil be naturally different, it must be rendered appropriate, as nearly as possible, for asparagus, by combination with sea sand, loam, decomposed turf, and a large quantity of the richest manure, such as that from a slaughter-house. Seakale does not demand so much depth of rank soil as asparagus, or rhubarb, which is tap-rooted. Sea-weed is an admirable *condiment* in their food; the method of propagating them all is almost the same. After deep trenching and blending of the manuring substances with the bottom layer of mould, and throughout the whole of it, form the ground (for asparagus) into beds four feet wide, with alleys of two feet intervening, and to prevent any future irregularities in dressing the beds and digging the alleys, fix short stout stakes permanently at every corner of each bed, so that by stretching the line from end to end during those operations, the beds may be kept at their original breadth: mark two drills nine inches from the edges of the beds, and one in the centre fifteen inches from those outer ones; drop the seed in patches (to be thinned afterwards), and cover it with an inch of earth. You may take a crop of onions and radishes (very thinly sown broadcast) the *first* year. The distances for seakale and rhubarb between the drills should be 2 feet, and if the seed have been dropped irregularly in the drill, the plants must be thinned out to two or 2½ feet apart. Economy of seed, however, demands

that it should be dropped only where actually required. "The third spring, several stalks may be gathered from each plant, and the fourth spring the plantation will be in full bearing. Excepting in the first spring after sowing, no spring dressing is required till May, after the crop has been gathered. The London market gardeners plant the seakale in rows from four to six feet apart, and every autumn, after the leaves have died down to the surface, they dig a trench between the rows, and cover the plants with soil to the depth of a foot. As the crop is gathered, the ridges so formed are levelled down, and a crop planted between. By this mode, the whole produce of the plant is gathered at once, every part of it being completely blanched and tender."*

Make plantations of artichokes, which will grow very well in a stiff soil properly managed, though a rich friable loam will be far better for them, as for all productions generally. Trench, or at least dig the ground deeply; then stretch your line, open holes fifteen inches in diameter and twelve inches deep, three feet apart; put two well-rooted offsets into each hole, with the tops above ground, and manure round the roots; then draw the line for the next row four feet distant from the first, and proceed as before, digging good manure into the intervals. Plants put down early this month will produce some heads at the end of autumn. Dress the established plantations, levelling the trenches, removing superfluous stools, and blending the litter, which had been protecting the plants, with the soil.

Jerusalem artichokes, once planted, will take care of themselves; like potatoes, they have a disposition to renew their growth from the tubers left in the ground during the winter; the best way of propagat-

ing them, however, is by planting sets of the tuber in well-manured drills, exactly as potatoes are cultivated; any soil is good enough for them, though that which is light and sandy is the best. Once established, it is not easy to get rid of them, as any fractional part of a tuber that has an eye will grow.

Do not lose a season for any of your kitchen garden seeds, most of the common sorts of which may, however, be now sown in sheltered borders, if the ground be in a good state. Turnips and radishes will require a warm bed, and though French beans may be sown against a south wall, their success is doubtful if they be put down before the end of the month at soonest. Do not omit sowing the seed of Brussels sprouts, as well as that of the savoy, borecole, and successions of peas and beans. When you have levelled the ribbed and winter-manured ground for carrots and parsnips, sow both crops in sufficiently wide drills, leaving a greater breadth, however, between those of the latter than of the former—say sixteen inches—and thin the plants to eight inches asunder: stake peas, plant and earth up cabbages, transplant cauliflowers and lettuces, and put down cuttings of pot herbs, and offsets of chives; pick up and re-make gravel, and mow turf walks; dig and rake borders. The planting of fruit-trees may be proceeded with, but the details are not given until the operations of October or November are considered, which are better months for the purpose. Mulch the valuable kinds, especially if newly planted, to keep out drought. The planting of evergreens had better be postponed till next month: if you *do* plant or transplant stake them well, or the wind will shake them severely. Peg down roses, and finish the pruning of them; lay some, and take off suckers; slip and part roots of various plants. Dig the ground in the nursery between the rows; prick out seedlings, and plant cuttings and slips, and put

down acorns, kernels, and berries, of various kinds, in beds of well-prepared earth.

Fruit Garden.—Protect the blossoms of Peaches, &c. in the open garden from frost and sharp winds, and lay manure over their roots if you have not done so before.

The pruning of fruit-trees ought to have been finished at or before the commencement of this month.

The important operations of grafting are to be proceeded with; its modes are very numerous, but whatever be the method, it is essential that the scion and stock be at least of the same genus, if not varieties of the same species.*

For small grafts of fruit-trees, Rose trees, Pelargoniums, Camellias, &c., a cement of these ingredients is excellent:—Rosin, one part; pitch, ditto; bees'-wax, half part; to be melted together, and applied with a small painting brush or a few feathers together over the thread. A man accustomed to this method of grafting (no favourite with our gardeners however) can graft one hundred or more stocks in a day.

It is by cleft-grafting however that the French propagate their numerous varieties of Roses in spring: they consider it the most simple and certain method, if care is taken during the summer to pinch the shoots of the Rose grafts to from four to six inches to make them branch, and to rub off most of the buds at the lower end. The French gardeners obtain Roses in two months from the time of grafting, and for stocks

* There are exceptions to this as to most general rules. The medlar and the pear will unite with the hawthorn, though the genera be different, because they happen to have some peculiar assimilations of organization and temperament, the want of which prevents the union of other trees, as of the peach with the cherry, and of the apple with the pear; the latter indeed may be grafted, but they do not thrive well. See directions for Grafting and Layering, at pages 37—47.

they use Dog-briars at least two years old, which are removed from the hedges and forests* to the nursery in the previous autumn, and planted closely in rows eighteen inches asunder, each stock being tied at two points to two transverse stakes fastened to upright ones.

Side-grafting may be usefully resorted to for supplying a branch in a vacancy, or "for the sake of having different kinds of flowers and fruits upon the same tree," but it is better to graft on the side branches than on the main stem, because, in consequence of the flow of the sap not being interrupted by heading down the tree, the success of this kind of grafting is more uncertain than almost any other method.

A mode of side-grafting termed by the French gardeners *placage* (veneering) is employed by them for Pelargoniums and Camellias. It consists in attaching the graft, which is a thin layer of the bark, with a bud attached to the stock, from which a corresponding slice is smoothly detached to give place to it.†

When the stock and graft are of the same size, and that a convenient one, they may be easily united by ordinary splicing; but to obtain more points of contact and to fix them firmly together, the bark at each extremity where the knife first entered should be raised a little, to admit its lapping over the narrow end of the splice, which must be neatly bevilled to make it fit closely.

Graft and inarch Camellias, &c.

Herbaceous plants, such as the Dahlia and Pæony, may now be propagated (as a matter of curiosity) with a dormant eye, that is, by inserting a bud on the neck

* Those taken from a light soil are best, because their capillary roots are more abundant than those of Dog-rose Briars raised in a stiff one.

† Loudon's Sub. Hort.

of the tubercle in a small hole made to receive it, and so that the base of the bud shall be on a level with the surface of the tubercle. Grafting-wax must be applied to the edges. If the tuber be potted and put in heat under glass, the bud which is not to be covered with earth will push. A growing shoot instead of a bud may be inserted in a later period of the year, when the natural season for the vegetation of these plants has arrived.

APRIL.

Stove and Greenhouse.—Go on potting, propagating by cuttings, &c., and shade the forcing-pits. If the sun be strong, moderate your fires, and let them out by day. Keep the heat during the night at about 55° , which will answer also for late peaches, which should now be disbudded, and from 65° to 70° by day. Train vines, thin out grapes, and at the end of the month commence the summer pruning of these. Water your Camellias, and endeavour to keep up a moist atmosphere, by sprinkling the alleys in the afternoon. Syringe other plants with rain water three or four times a week towards evening, and apply the water gently, and particularly so if plants are in a languishing state from want of it, because their roots are not then in a state to perform their functions all at once, but, by wetting them gradually, their healthy action will be restored, and watering in sunshine is so injurious, that many plants are suddenly killed by it. By excessive watering, also, the leaves of a delicate plant become yellow, and lie heavily against the stem. Water them in the afternoon from this time until October. Accustom the plants gradually to the open air, to which so many will be soon transferred altogether.

Attend to preceding hints respecting the care of Auriculas and Carnations.

The Pelargoniums and other plants which have not

yet opened their flowers should be syringed very gently, and if the moisture has not been sufficiently evaporated during the night admit some fresh air in the morning.

Forced Roses are now in blow; take them and other plants in the same state, or ready to blow, from the forcing pots into the greenhouse or conservatory, and put those that have flowered (or those which you wish to keep in flower) into a shaded place. Move out some of the hardiest and well-established potted plants if you want room into temporary pits shaded only with matting.

Pits and Frames.—Sow seeds of cucumber and vegetable marrow in moderate hotbeds for putting out next month. If the Aphis, or the thrip, or red spider, attacks your melons, syringe gently under the surface of the leaves with a solution of half an ounce of soft soap dissolved in half a pint of tobacco, and a quart of plain water. One person must hold up the leaves while the other uses the syringe. Raise the sashes of your frames to let the condensed air evaporate, else the solution will destroy the plants as well as the insects feeding on them. When watering melons in the ordinary way, pour the water, not on the leaves, but on the roots, and not after the fruit is setting.

Flower Garden.—Transplant tender annuals in hotbeds—and if the plants are delicate, renovate them with guano or sulphate of lime. The guano should be largely diluted with water. Half-hardy plants will still require occasional protection.

Sow hardy annuals and biennials of various sorts in beds and borders. Lay some fine compost over the beds of Ranunculuses when they are coming up, and press it round the necks of the plants when they are well up.

Shade the Pansies intended for shows, and preserve them free from slugs. Cross breeding by impregna-

tions should be proceeded with in the case of Polyanthuses, &c. &c.

Kitchen Garden.—Make a mushroom bed in proportion to the quantity of mushrooms you want to raise (as for cucumbers), only drawing it up in the form of the sloping roof of a house, beating it well as you proceed, especially at the sides; throw mats over it for some days, until you find the fermentation at a moderate degree of heat, such as your hand can bear; then cover it an inch deep with earth, into which you are to put portions of spawn about the size of a pigeon's egg, at about eight inches apart every way; put an inch of earth over this, beat it down with the back of a spade, and replace the matting, unless the weather be very warm, and soft showers falling, in which case it should be occasionally raised.* In six weeks the mushrooms will appear, and they will continue to afford a crop for about the same length of time: very delicate watering may be given if the weather be not moist. If you have a suitable house, you can command almost continual successions, by means of beds heated by flues, and by various contrivances, as to compartments for the successions of spawn cakes, which you can make with dry horse dung (from hay and corn only), cow dung, and loam, in equal parts, well beaten and blended together.† Mr. Hankin, gardener to Captain Mitford, in a recent communication to the editor of the *Gardeners' Chronicle*, describes his very successful and simple mode of raising them in wooden boxes thus:—He first collects the fresh droppings from the stable, and lays it in a shed to dry before it is used; he then puts it into wooden boxes at nine inches deep, trellised at bottom (to allow the heated air of the house to enter into the dung when

* See Cobbett's *English Gardening*.

† Loudon, p. 524.

put in), and with as much dry litter as will prevent the dung from dropping through the bars, beating the dung in layers of two or three inches thick with a mallet, until it is within an inch and a half of the top: these boxes are placed in a house heated by open tanks running through the centre. After the fermentation has subsided to a proper temperature, he puts in large pieces of the spawn as compact as possible, eight inches apart every way. In a week or ten days afterwards he lays green turf an inch and a half thick to fill up the boxes, well beaten.

Mushrooms in a natural state of growth are best and most abundant on turf cropped and trodden, as by sheep and cows; and Mr. Hankin has found by experiment, that mushrooms raised under a covering of turf are far superior as to flavour to those which he has forced under coal dust.

Evergreens.—Our own practice has been to transplant them during this month, in preference to any other season. The storms of winter being over, they are not likely to have their roots shaken, and the moisture of spring will insure their striking, if they are taken up without serious injury, and properly put down in loose and appropriate soil. In taking up any large shrubs, you should work with a pick, so as to undermine the roots; take the fibres up carefully as you trace them through the earth, and tie them to the larger roots; drag* the roots with as little force as possible; re-plant them quickly, because exposure to the sun and air is very prejudicial to the roots; if, therefore, your plants are to be removed to any considerable distance, or kept out of ground for more than a few hours, pack them with balls of earth round the roots (but leave the branches loose, else the leaves will

* Iron bars are constructed for the purpose of raising large shrubs and trees.

fade), or soak these well in thick, rank puddle, and cover them up with hay ropes, until you are about to put them down, when they should be thoroughly drenched. Mr. McNab, a Scotch horticulturist of great celebrity, says—

“The best plan is to take an old birch broom, or anything similar, and laying it down near to the root, to cause the water to be poured upon it; this breaks the fall of the water, and prevents the roots from being washed bare of such earth as may adhere to them; in this way time is saved, for the water may be poured out in a full stream from a pail, a water-pot, or even from a spout or pipe in the water cart or barrel, where the situation is such that this can be brought up to the plant. After the first watering has dried up, the earth should be levelled round the stem of the plant, and as far out as the water has been put on, but not trodden; if the plants are large, a second watering is sometimes necessary, but in ordinary sized plants *one* watering is quite sufficient, and after remaining twenty-four hours, more or less according to the nature of the soil, the earth about the stem and over the roots should be trodden as firm as possible, and after treading should be dressed with a rake. Where this is practised, and the planting done in winter in cloudy weather, there is scarcely a chance of any dry weather afterwards injuring them; but if this method or something similar is not practised, there will be a great risk of failure every year in planting evergreens, particularly when they are planted at the usual times recommended, that is, in the spring or autumn. Always water evergreens when planted, whether the work be done in wet weather, dull weather, or dry, sheltered or exposed, because the watering in the manner recommended fills up the holes that may be in the earth about the roots, and consolidates the whole mass much better than treading could do.”

Never tread stiff soil round the roots, which should be encouraged as much as possible to strike freely through it.

MAY.

Stove, Greenhouse, &c.—Shift by degrees, as they may require it, the newly-propagated plants; sprinkle water abundantly on the floor, for the diffusion of moisture in the air of the house; throw some shading over the glass beneath which are the young plants, when the sun is very powerful; ventilate and syringe.

In the greenhouse, encourage the plants to grow freely; finish the shifting and dressing, to prepare plants for a change of quarters; put out first the most hardy, and those whose tops renew themselves as it were annually, but be guided in this by the weather and climate, and do not be too hasty, though it be a great object to put out the coarser plants, in order to make more room for the finer kinds.

Prune Heaths that have done flowering; plunging them, and Cape and Australian plants generally, in moss, will cause them to retain more equable moisture and warmth than if they were bedded in earth and tan. Keep the temperature of the conservatory as low as you can—but not too dry—to prolong the time of flowering; and as you will want room in this house for many successions of plants in blow during the summer, you ought not to occupy it with any that do not require its protection. Roses will now be blowing under glass freely; you may still graft some of this tribe, and Camellias that have been early forced. Give plenty of air to peaches that are ripening, and remove leaves that shade the fruit.

Frames and Pits.—Thin the laterals of the melon plants, and if the early crop has been removed, you may dress the beds for receiving a new set of plants.

Recommence propagating greenhouse plants by cuttings for the next year.

Flower Garden.—Examine the Tulips now in blow, in order to select the most perfect for crossing; this you can do by taking out the anthers just as the flower opens, and applying farina with a camel hair brush to the stigma, as has been elsewhere explained. Never cross a Rose or Byblomen with a bizarre, as the progeny would most probably be tricolours, which are not so much esteemed as those of pure breed.* Shade them from hot sun and heavy rain by means of stakes, eighteen inches apart, along the sides of the beds, with hoops tied across them to support the covering material. The same simple contrivance you can adopt for Auriculas, Hyacinths, Ranunculuses, and Anemones. Tie up Carnations and Pinks as they require it to stakes.† From the middle to the end of this month plant out Dahlias that have been parted, and that have pushed in hotbeds, in strong, warm, and moderately rich soil, and very well dug from four to six feet apart every way, according to their natural height and foliage. They may also be propagated by

* Gardeners' Chronicle.

† For protecting these tender flowers, Balsams and Coxcombs, &c., which grow tall, the awning which Mr. Mawe used is to be recommended for its simplicity and cheapness. Fix at each corner of the bed an upright post about four feet high, and on the inside of each post let some auger holes be bored, allowing six inches between hole and hole; then provide four iron or wooden pins, one for each post, and fitted for the said holes. When the frame wants to be raised, let the pins be placed in the holes of the post at a convenient height, and set the frame upon the pins. When the frame wants raising again, fix the pins a hole higher, and so proceed as the plants rise in height. Mind to close up the vacancy at bottom at each time of elevating the frame, by nailing some good thick mats round the outside below.

The awning (as a protection from sunshine) should be removed towards evening, and not replaced before nine or ten o'clock next day.

young shoots cut off with a small portion of the crown, and potted under a frame.

When your object is to multiply choice varieties, you should separate the parent crown to the utmost, and encourage numerous shoots, each of which will produce a plant.

Sow biennials, perennials, and hardy annuals, if not done last month, and pot out tender annuals.

Kitchen Garden.—Sow successions; towards the end of the month, plant out celery plants in drills, if they have been previously pricked out and again transplanted in rich nursery plantation, in which case they will be well rooted. Make trenches running north and south, four feet from centre to centre, and one foot deep; dig at least six inches deep of old hotbed dung into each trench as it is opened, and put the plants along the middle six or eight inches apart with a trowel. In preparing the plants, take off all side slips; but if the roots be vigorous, as they will be under proper previous treatment, you ought neither to trim them, nor cut off the leaves, as is so frequently done in utter ignorance of the principles of vegetation. If the sort of celery be diminutive, the trenches may be a little nearer; and if the red, solid, or any other large kind be selected, the trenches should be more apart, to admit of copious earthings.

Plant out cauliflowers under glasses; sow turnips, &c., &c., and a main crop of scarlet runners, wetting the drills profusely. Transplant cabbages, savoys, and lettuces; prick out celery plants for successions.

Prepare slight hotbeds for vegetable marrow and gherkins in the open air; for the former there should be at least twelve inches of fine compost, spread over at least two feet of horse and cow-dung mixed; as this vegetable throws out numerous runners, and produces abundantly in favourable weather, one plant will be sufficient for each square yard. Thin out car-

rots, parsnips, turnips, &c.; plant tomatoes against a south wall in open spaces between fruit-trees, making holes well manured to receive the plants, which should be carefully taken from the pots. Plant vines if wanted in the borders; earth up your drill crops neatly, and water those that require it, else your previous care may be fruitless. I shall conclude the observations for this month with a caution respecting the cutting of asparagus for the table:—

“If you have ever examined the crown of the plant in the budding season, you will have remarked, that besides the fine shoot you are about to cut off there are many others, in various stages of their growth, under the surface; and if in cutting the one you maim any of the rest, you destroy those shoots, and may materially injure the crown itself. Now on the continent, where they are very careful gardeners, they make use of an implement for this special purpose not unlike a lock saw, but narrower, longer, and finer, the blade being about eight inches in length, one inch wide at the haft, and terminating in half an inch at the point, which is rounded, and the blade, instead of being sharp, has a fine serrated edge, which will not slip, but merely cut the stem to which it is applied. I have another hint or two for you also, unless where you are like me very impatient, and mean, according to my former suggestion, to sacrifice a few beds for an early cutting.

“I would wish you to observe this rule:—Don't be tempted to cut the largest shoots: in the third season from making a successful plantation from each crown, four shoots may probably appear at the same time, two of them perhaps large and two small: be content with one large and one small one, leaving the others, and especially the strong one, which is the best calculated to supply the returning sap in abundance to the increasing root. One word more: Let

no avarice, or economy, or limitation of garden soil, induce you to sow or plant any other crop on your beds or in your alleys.

“I have seen a square of asparagus beds trampled into a flag, or like a hard foot-path, by a lazy gardener or his lazier labourer crossing the beds day after day to cut a crop of cauliflowers from the intermediate alleys.”*

JUNE.

Stove, Greenhouse, &c.—Keep a high temperature for the ripening grapes—thin the later ones—ventilate—and guard against the attacks of the red spider. This is a good time for repairing the houses and painting the sashes, &c. as the plants can bear more exposure to the open air now than at other periods of the year—on an average of seasons. Graft Camellias, Rhododendrons, Azaleas, &c. Give as much room as you can to the plants, which should be turned regularly to and from the light, if you wish to preserve their uniformity of growth on all sides; but in show specimens, it is important that the side to be exposed to view should always front the light: do not suffer more than a few of the choice *old* specimens to ripen their seeds, at the expense of their vigour. Put out in the open ground at least some Fuchsias on Mr. Wood’s plan,† in peat mould, in order that they may grow freely, which will enable them to furnish numerous cuttings, and render their subsequent bloom finer. Treat the inferior kinds of the Pelargonium in the same manner, removing the old plants from their pots to the open ground until the commencement of autumn, when they should be taken up and repotted for forcing in the spring following. Take cuttings from the old

* Kitchen Garden. By Martin Doyle.

† See Gardeners’ Chronicle, June 1844.

plants now, which if well managed will blow this time twelvemonth. Fumigate with tobacco to destroy insects.

Frames and Pits.—Prepare to make a large plantation of your choice dwarf and young plants in these useful structures, turned out of the pots for two or three months in suitable composts. One who has not seen the good effects of this plan can hardly conceive the improvement it makes in the plants, particularly in Heaths, Epacrises, and other delicate plants, which are difficult to manage in dry hot seasons under the ordinary pot culture.* Attend to previous directions respecting melons and cucumbers.

Flower Garden.—Take up the bulbs of Tulips, &c. that are out of blow and whose leaves have become yellowish, and lay them in a shaded place until they are dry enough to have their outer skins taken off, and to be packed in paper bags. Keep a hand-glass over those which you design for seed. Shade Ranunculuses and Auriculas. Propagate Pansies by slips or cuttings, and part Polyanthuses in showery weather, and beware of the green-fly, which is a great enemy to the Auricula in particular, whose heart it feeds upon. Cut down the stems of Auriculas and Polyanthuses, if not wanted to bear seed. Tie up Carnations as they require it with soft thread, which should not be so tightly bound as to prevent the free growth of the stem: pinch laterals and disbud. Stake Dahlias—plant slips of Double Wall-flowers—perform various matters of routine which it is needless to recapitulate.

Fruit and Kitchen Garden.—Give the last thinning to the fruit on the peach-trees, &c., and remove all superfluous young shoots, nailing those which you retain. Clear gooseberry, currant, and raspberry trees

* Gardeners' Chron. June 22, 1844.

from all young shoots which will not be wanted next year. Trim off the tops of stocks on which grafts have been established, and remove the grafting clay and bandages. Protect your cherry trees by netting. Water strawberries if the weather be dry and hot, or else the fruit will ripen too fast, and be therefore diminutive in size. Tie up some of your finest cauliflowers for seed, and sow some cauliflower seed early in the month for a late autumn crop. Sow also Knight's green marrow pea and mazagan beans for the same purpose; also brocoli seed for next winter and spring, and turnip seed for a full winter crop, and continue to sow all other ordinary successions. Thin onions, carrots, turnips, &c.—transplant celery—put out slips of pot-herbs—water abundantly; lettuces in particular will start in dry weather, unless regularly watered. Strew the young leaves of cauliflowers among them at night if you desire to catch slugs, which otherwise may devour your lettuces; these destructive creatures will gorge on the former vegetable in preference, and repose under its leaves towards morning, when they may be taken. Keep the hoe and fingers going, else weeds will overpower you, and attend to the grass and gravel walks constantly.

Nursery.—Continue to propagate by layers and cuttings, and hoe between the rows of seedlings, and attend to the summer training as to form.

JULY.

Stove and Greenhouse, &c.—"Examine the pots, and if the soil or drainage is not in a proper condition, shake the mould away from the roots and repot them in light soil. Sandy loam is better for wintering delicate stove plants in than composts containing either peat or leaf-mould; some kinds of peat are very liable to get soddened in a close stove in winter, but in frames and greenhouses nothing suits better. In

the beginning of the growing season, all kinds of stimulants were in requisition to insure a rapid growth, but from this time all safe modes of retarding vegetation should be resorted to, in order that this season's growth may be ripened as much as our means can effect. These general rules may be of more use than minute details."*

Ventilate the peach-house perfectly; the ripening fruit requires a free circulation of air, for which purpose the door should be left open even at night, unless a rapid maturity be desired. Remove the small berries from the bunches of grapes, and whitewash the walls of the grapery, if the red spider be at work. Water more sparingly in the greenhouse and conservatory. Put out the early struck cuttings of *Pelargoniums* into beds in the open garden, or in a pit a few inches deep, hooped over so as to admit of a matting cover across; plant them with a dibber in rows six inches apart, and label the sorts; place a forked stick upright at each end, on this lay a transverse pole, over which you can throw some protecting cover, until the cuttings have struck in the new soil. The usual time for taking cuttings of *Pelargoniums* is immediately after they have done flowering, when they should be headed to the second or third leaf above this year's shoot. You may also, with great propriety, put four or five cuttings into pots of five or six inches in diameter, an inch from the sides, which pots can be laid under the shading of a wall (but not under the drip from it), where, though they may be exposed to much rain, the evaporation will be so great as to prevent those ill effects which confined moisture will have on their general vigour, however much it might promote their striking. The three summer months are the most favourable for taking cuttings of *Pelargoniums*, though

they may be struck at almost any season ; some of the variegated sorts, however, will not strike well after this month, or the beginning of the next.

Budding is now to be executed with energy, though it may have commenced in the preceding, and may be continued in the ensuing month. Mr. Cobbett's detail of the operation is so remarkably perspicuous, that I cannot resist the temptation to insert it.

"In choosing and preparing the bud, fix on one seated at about the middle of a healthy shoot of the midsummer growth ; these are, generally speaking, most inclined to fruitfulness. Choose a cloudy day, if you have a choice of days at this season, and if not, perform your work early in the morning, or in the evening. The time being proper, you sever the branch on which you find buds to your liking ; take this with you to the stock that you are going to bud : holding the branch in your left hand, the largest end downwards, make a sloping cut from about an inch and a half below the bud to about an inch above it, suffering your knife to go through the bark and about half-way into the wood, cutting out wood and all.

"This keeping of the wood prevents the bud and its bark from drying, whilst you are preparing the incision in the stock, and if you wish to carry buds of any scarce sorts to any distance, you may do so safely by putting their ends in water or in damp moss ; but it is always safer, as well in grafting as in budding, to perform the operation with as much expedition as possible, but particularly it is so in budding. Cut off the leaf under which the bud is seated, but leave its foot-stalk, and by this hold it between your lips while with your budding knife you cut two straight lines in the stock at the place where you wish to insert the bud, and this should be at a place where the bark is smooth, free from any bruises or knots, and on the side rather from the mid-day sun. Of these lines let

the first be horizontal, and let the next be longitudinal, beginning at the middle of the first cut and coming downward. Let them, in short, describe the two principal bars of the Roman letter T. You have now to take out from the bark on which your bud is the piece of wood on which the bark is, and which has served you up to this time to preserve the bark and bud from drying and shrinking. But this is a nice matter. In doing it you must be careful not to endanger the root as it is called of the bud, because in that is its existence. The bark (if the season be proper for budding) will easily detach itself from this piece of wood; but still it requires very careful handling to get it out without endangering the root of the bud. Hold the bud upon your forefinger and keep your thumb on the wood opposite, then with the forefinger and thumb of the other hand bend backward and forward the lower end of the shield, and thus coax the wood to disengage itself from the bark, and when you find it decidedly doing so, remove your thumb from it, and the whole piece of wood will come out, leaving you nothing but a piece of bark of about $2\frac{1}{2}$ inches long, with a bud and footstalk of a leaf on it. If the root of the bud be carried away with the piece of wood you will perceive a small cavity where it *ought* to be. In this case, throw away the bud and try another. Having succeeded in a second attempt, now open the two sides of the longitudinal bar of the T with the ivory haft of your budding knife, but in doing this raise the bark clearly down to the wood, for the inside of the piece of bark belonging to the bud must be placed directly against this. Having opened these sides wide enough to receive the longest end of bark, insert it nicely, taking especial care that its inner side lie flatly against the wood of the stock. Then cut the upper end of the bark off, so that its edge shall meet precisely the edge of the horizontal

bar of the T. With your finger and thumb bring the two sides of the longitudinal bar over the bark of the bud, or rather the shield, and with a piece of well-soaked matting begin an inch below this bar, and bind all the way up to an inch above the horizontal bar, taking good care to leave the bud peeping out. Bind in such a way as to exclude the air, for that is the intent of binding in this case. Tie your piece of matting on first, and then wind it round and round the stock, as you would a ribbon, taking care not to twist the matting. Wind it slowly, and every time you have gone completely round give a gentle pull to make it firm."

Pits and Frames, and open Hotbeds.—Thin the leaves of melons and stop the laterals of the successional plants; peg down the runners of cucumbers, vegetable marrow, and gourds; renew linings where wanted, and make fresh beds for late crops; keep mushroom beds that are bearing cool.

Flower Garden.—Tie up Carnations and shade them. This is usually a rainy month, but if otherwise you must water them; beware, however, of using "fresh cow manure" dissolved in the water for those delicate plants, as some gardeners have done to their vexation—grubs having been generated by this matter in such numbers as to destroy the layers.* Take up Ranunculuses of value when their leaves fade, for by a fresh vegetation they sustain injury. Arrange the Pelargoniums that are going out of flower in a sunny border, cutting them down as before directed, when the wood has fully ripened. Protect Auriculas and Polyanthuses from rain.

From the middle of June to the end of the first week of this month is the proper season for propagating Carnations and Pinks by cuttings and pipings. To take a

* See Gardeners' Chron., July 20, 1844.

cutting, you are to cut across the shoot immediately under a joint (the second one from the top being preferable); to make a piping, you do not use the knife in the first instance, but hold the selected shoot firmly with the left hand, while with the other you pull out the portion of shoot above the joint. If there be any part wounded by the operation throw the shoot away and begin again, unless it be so slight as to admit of being made smooth by a gentle application of the knife; peel off the outer skin from the joint, and then—though this is not important—you may slit up the joint about a quarter of an inch, and insert a little mould in the opening to keep the edges from closing: a little trimming of the leaves may then take place—of course those that are decaying should be entirely removed—and the piping is prepared. When you have a sufficient number of these ready, lay down a hand or striking glass on a mild hotbed or (shaded) border, to mark out the space which the glass covers: when the circumference is thus traced, put down the pipings with your finger, nearly an inch deep and an inch apart every way. Water twice. While the moisture continues on the plants do not cover them, else they may rot; but when they are perfectly dry, fix the glasses with the edges sunk in the mould* for about ten days, occasionally moistening the glass outside, and shading from the sun; when the cuttings or pipings—for they may be indifferently used—have struck give air every fine morning, but do not put on the glasses while there is moisture on the plants.

Fruit Garden.—Attend to the summer pruning and fastening of your fruit-trees, which will now be infested with caterpillars if you neglected syringing in the earlier season. Keep the surface of the borders

* Well-rotted turf, leaf-mould, sand, and dung, constitute the best compost for Carnations and Pinks.

loose and sufficiently watered. Examine, likewise, the state of the soil with regard to moisture at the depth the roots generally penetrate; and if it be too dry, a large quantity of water must be supplied. If such watering be required and not now attended to, it cannot be given afterwards when the fruit is ripening without spoiling the flavour: besides, nothing encourages the red spider more than dryness at the root.

Kitchen Garden.—About the middle of the month sow your last crops of French beans and peas; earth and stake preceding ones; sow winter turnips, for which coal ashes or charcoal are peculiarly stimulating and nourishing, with a reasonable supply of mixed animal and vegetable manures well rotted. Early York and Penton cabbage seeds should also be sown during the month, and seed for coleworts and spring greens.* This is usually a wet month with us, and therefore favourable for transplanting all the varieties of the cabbage tribe, which should be planted out for winter and spring use, brocoli, borecole, Brussels sprouts, savoy. Brocoli plants should have four feet between the rows, and three from plant to plant in very rich ground, for in such case the fibres push out to a great extent, and the foliage becomes much extended. It is indeed miserable economy to crowd any of those cabbage tribes which naturally grow to a large size.

With respect to the common hardy kinds—drum-heads, borecole, &c.—there is no necessity for giving them your best soil; for if the ground be deeply dug and fairly manured, they will succeed even in yellow clay, especially if it be newly broken up. Digging between the rows will cause the roots to push, and the stirring of the soil frequently is a fine preparation for

* Peat ashes are an excellent manure for the seedling beds.

succeeding crops. When the stalks are pulled out of the earth in their due time, the most naturally tenacious land is found to be considerably loosened, through the agency of their powerful roots.* Except as channels for carrying off the superfluous moisture of a retentive soil, moulding up cabbages in a sheltered position is really useless; it is on the deep and thorough loosening of the soil about their roots that their success, as far as mere labour is concerned, depends; laying up a mass of earth to the stem cannot tend to the nutriment of the plant, though it may assist to support a weakly stem shaken by the wind. If the weather be dry, give two waterings to the transplanted cabbages. Plant celery; tie up lettuces and endive for blanching; plant out lettuces fourteen inches every way for spring, and sow for coleworts in spring, and execute whatever was omitted last month, or may be properly done in preparation for the next.

AUGUST.

Stove, Greenhouse, &c.—Water more sparingly, and only in the morning. Remove the sashes from the early peach-house, to admit free air and natural moisture to the buds, which will be serviceable to them for the following season, and as a dry atmosphere is now necessary for ripening the wood of the stove plants, on which their future flowering and fruiting so much depends, you had better remove those exotics that can bear the shifting to the early grape-house, where they can have air and light in abundance. Do not, however, put any plants which require regular watering into houses in which are *ripening* grapes, for these would be injured in their flavour by any degree of moisture around them.

Frames and Pits.—Do not water melons when

• See Gardeners' Chron.

their fruit is maturing, but give plenty of air. Shift Heaths—those beautiful plants of which some varieties are always to be seen in blow—under garden frames in preference to the confinement of the greenhouse. Indeed the frames ought now to be filled with the hardier greenhouse plants, of which the sashes should be raised at night to admit the dew.

Flower Garden.—Tie up Dahlias as they rise, and see that the first ties are sufficiently loose. Plant out the Pink pipings that have rooted, and propagate more if you want them. Layer Chrysanthemums; make beds of Pansies; proceed with the budding of Roses, if the bark be not too dry to rise easily. Strike cuttings of Noisette and Chinese Roses, and of Pelargoniums in pots under hand-glasses, or in the frames; cut back Pelargoniums and the soft-wooded greenhouse plants that become large in the course of one or two seasons, in the manner described last month; shake them out of their mould when they have become dry; shorten the roots, and shift them into fresh pots as small as they can fit into, and when they have pushed out shoots an inch long, shift them again into smaller pots, shaking off the old mould from the roots, which should be pruned to within two inches of the stem.* When they have made new roots, place them in a more open situation, until they are to be removed to the greenhouse. Repot the Pelargoniums that have been struck from cuttings early in the spring. Part the roots of Calceolarias and Cinerarias (if not done last month), and treat them afterwards as just directed for Pelargoniums. Sow Ten-weeks' Stocks under hand-glasses or in a vacant pit, which however will be better tenanted by the various cuttings required in the propagating department. Prick out seedling Pansies. Prick out into small pots the Carnation pipings that were put under

hand-glasses six weeks ago, and place them in a mild hotbed, or under hand-glasses again, until their roots take.

Gather seeds as they ripen, which in most cases will be when the upper part of the pod is brown; if they be left longer, they become loosened from the calyx, and if light they are in danger of being blown away by the wind. Dry them in the sun, and then put them into paper bags, in a place perfectly free from dampness.

Fruit Garden.—Attend to the summer pruning of the fruit-trees, shortening leaders and side shoots according to the peculiarities of the tree. Thin grapes, and prune superfluous shoots. If mildew seizes on any of the trees, dust them with flour of sulphur.

Make fresh plantations of strawberries, which ought indeed to be changed from one compartment to another every four years; prepare the ground well for them, putting in dung; then draw your line, and with the fingers put down strong runners in rows from two and a half to three and a half feet apart, according to the sort of strawberry, and twelve or sixteen inches asunder in the rows; give a good watering. You may, for the *first* year, sow onion seed or salading between the rows.

Kitchen Garden.—Tie up celery for blanching, and mould up gradually and closely. Bend down the tops of early-sown onions with the back of a rake, to make the bulbs swell. Take up what remains of autumn-sown Strasburgh onions, potatoe-onions, shallots, and garlic, when their leaves become yellowish. Sow cauliflower seed for next year's early crop, to be pricked out next month under frames or in a warm border, and regulate the period of sowing by the nature of the soil, which, if tenacious, should be sown earlier than if light and porous. Sow red cabbage seed, and other kinds, and the stone-turnip,

early in the month for the last time ; plant out brown Dutch lettuces—taking precautions against the ravages of slugs—and broccoli for successions in spring.

Nursery.—Keep the young trees free from overhanging boughs, and give them exposure and room. Shorten laterals, if growing too freely, and leave no second leader.

SEPTEMBER.

Stove, Greenhouse, &c.—Examine the earth in the pots, and see that the drainage is free. The woody plants have done growing, therefore ventilate to ripen the wood ; water early ; keep slight fires in the stove-house if the weather require them. The mid-day sun will not now injure the greenhouse plants, because their great excitability is over. Bring into the house the tenderer plants that are out, leaving the hardier until the coldness of the season renders their continuance out of doors hazardous ; put fresh mould on the top of the pots brought in ; shift Chrysanthemums into flowering pots ; remove every vegetable matter that is decaying, else the effluvia produced by it will be pernicious.

Keep fires sufficient to prevent the late grapes from being injured by dampness.

If new trees are wanted for the peach-house to replace others, you may now bring them from the nursery or garden, old enough to produce next year ; by planting them early, their growth is checked, and the wood ripens for the ensuing crop. Change the earth in which you plant them after other peach-trees as well as you can, without injuring the fibres of those in the same neighbourhood.

Pits and Frames.—Continue to propagate, and expose the cuttings that have rooted to the weather, in order to make them hardy. Put Heaths and Fuchsias under frames, to guard them from heavy showers.

The Chinese Roses which were pruned closely last month should now be put into pots for blowing. Take care of the plants that are out to be hardened, lest frost attack them. Sow Tulip seed in pans: prepare spawn for mushrooms, and make beds for it; this is a principal month for the culture of mushrooms. Attend to former instructions respecting melons, cucumbers, and vegetable marrow.

Fruit Garden.—Gather fruit without bruising it; make strawberry plantations; trim off runners, but do not cut away the leaves, which is contrary to sound principles. Mildew frequently attacks apricot-trees—the common remedy is to syringe the leaves with sulphur or tobacco water; but, if the trees are not too old, the most effectual remedy is to remove them very carefully next month; drain and trench the border; adding, at the same time, as much fresh soil as you can afford; and with as little delay as possible, replant the trees.

Flower Garden.—Preserve Dahlias which continue to ornament the shrubberies and garden from breaking down, and give them liquid manure if they are not luxuriant. Plant offsets and small bulbs of Tulips, and a few fresh varieties—but not the main crop yet—and seedlings and offsets of Polyanthus and Auriculas; prick out seedling Pansies, top rooted layers, cuttings and pipings of Carnations and Pinks—and beware of the wire-worm. Put out herbaceous plants in the borders, and Crocuses, Snowdrops, &c. in a sheltered border. Sow Mignonette, Ten-week Stock, and other annuals, to stand over the winter for early blowing next summer. Trim and plant edgings of Box, Gentianella, and Indian moss.

Kitchen Garden.—Take advantage of showers to prick out seedling-cauliflowers and cabbages, sown from the 10th to the 20th of last month, and to plant out coleworts, savoys, &c. for winter and spring; and

when at any time you are planting the cabbage tribe, pare off the knobs which you will occasionally find on the roots, which contain a destructive grub: transplant lettuces in rows ten inches apart, and eight inches from each other in the row, in warm loose earth. Take up onions, and dry them well in the sun. Sow cauliflower seed—which will be less likely to run than that sown earlier—radishes, spinach, cresses, mustard (for salading), and successions of chervil, in close and shallow drills, to be thinned out; earth celery—thin turnips, spinach, &c.—tie up lettuces and endive to blanch—expose the fruit of the tomato to the sun, by thinning the leaves.

Evergreens.—Plant evergreens at the end of the month, and deciduous trees later; stake them securely, and water copiously. Plant slips and cuttings of flowering shrubs when the wood is ripe—trench the ground for them if you can.

OCTOBER.

Stove, Greenhouse, &c.—Keep regular heat, say from 65° to 75°, to ripen the stove plants; but in the conservatory the temperature should not exceed 45° now, or in any of the winter months. Do not occupy the greenhouse or conservatory (supposing that you have a large stock of plants) with ordinary plants with thick foliage that are natives of temperate climates, as they may pass the winter very securely in pits or frames. Inure the plants which you bring in very gradually to close confinement. When arranging them in the greenhouse or the common frames, place them as much as possible according to their *genera*, but at the same time with a due attention to their relative sizes; because, since plants of the same family generally require similar treatment as to air, light, watering, and dressing, it is convenient to have in the same range, or near each other in some way, the homogeneous

plants. Before they are arranged for the winter, scarlet Pelargoniums which have been cut down and Calceolarias are by some eminent gardeners kept for a time in tan-pits and stowed closely.

Flower Garden.—Attend to last month's directions about Tulips, their seedlings and offsets; it is yet too early to plant the main crop. Put Mignonette in boxes or pots under cover; attend to the potted Carnations lest they suffer from frost; put Hyacinths, Narcissuses, and Jonquils, into water glasses, to make them vegetate and blow.

Many beautiful plants, such as Salvias and Fuchsias, will stand the winter well if protected by reeds or some simple frame-work during hard frost—moderate cold will not injure them—or even by a thick layer of peat-earth or sand to the roots. Plant Pansies, thin out the herbaceous plants in the borders, and keep walks perfectly clean. Plant out last year's layers and cuttings of Laurels, Jasmines, &c., &c.

Fruit Garden.—Plant out fruit-trees as soon as their leaves have generally fallen, which usually happens either in the end of the month or the commencement of the next; the peach, nectarine and apricot on a south* wall, in rich, fresh loam and with a dry bottom. Should the subsoil be cold and very unfavourable, you must flag or pave at the depth of eighteen inches; or deposit a layer of concrete. By supplying a good quantity of turf-mould and a moderate quantity of dung to the roots, and keeping the borders (which ought to be wide) free from crops, except those that grow near the surface, and do not exhaust the soil; by mulching and adding bone-dust, a poor and shallow soil will gradually be rendered fit for those

* An eastern aspect, however, will answer very well for the apricot: the distances at which these wall trees should be planted must depend on the height of the wall and also the breadth of the border, and on the mode of training.

trees, of which the peach and nectarine in our climate are amongst the most delicate, as they rarely produce well unless the borders are warm, rich, and dry, but not allowed to be too dry in summer. The apricot also requires a more sunny and drier climate than ours generally is; but this tree suffers much from mildew. All these will be most profitably planted against a south wall.

The soil for the apple and pear-tree cannot be too deep a loam, and if it be on a calcareous bottom so much the better; but "it will grow tolerably well in any common soil, neither extremely sandy, gravelly, nor clayey, on a dry subsoil, and with a free exposure. On wet subsoil it will do no good; but after being planted a few years will become cankered, and get covered with moss. Where fruit-trees must be planted on such soil, it should first be rendered as dry as possible by under draining; next, provision made for carrying off the rain water by surface gutters, when this may be found necessary, which however is rarely the case in the summer season; and lastly, the ground should not be trenched above a foot below the general level of the adjoining ground: but above this level the border may be raised another foot by the introduction of fresh soil, thus making the whole depth for the roots two feet. The trees should be planted rather in hillocks of earth above the surface than in pits dug below it. There is no point of more importance than shallow trenching and shallow planting in cold wet soils, in which deep pits and deep pulverization only serve to aggravate their natural evils of moisture and cold."* In putting down peach-trees, &c., observe these rules,—to raise the hillocks to such an elevation above the surface as will allow for sinking only so far that ultimately the collar or part of the stem whence the first roots proceed shall be be-

* Sang.

tween two and four inches above the general surface. The collar should be from six to nine inches from the wall for the above trees, and for the apple, pear, and cherry, from nine to twelve inches,* on a retentive subsoil, where the roots are liable to be in a medium too wet and cold at one period of the year, and too dry and impenetrable at another.

The cherry-tree will thrive in a sandy soil if the aspect be good, and the plum, which should never be allowed to usurp a place suitable to the peach, requires a medium soil, between that suited to the cherry and the apple or pear. You may also now plant in open situations the gooseberry, and currants, raspberries, &c. ; in short, this is the time for making all your fruit-tree plantations, and an excellent season for planting stocks for the spring and summer grafting, and budding. Gather fruit as it ripens, or rather before; it would otherwise naturally drop from the tree, especially if there be danger of frost, which makes fruit decay quickly. Apples whose pips are found to be ripe should be gathered, whatever be the outward appearance.

Kitchen Garden.—Cut down the asparagus and dress the beds with litter or a couple of inches of short dung; protect endive, and seedling cauliflowers, as well as the plants which are heading, from frost, and prolong the fruiting of French beans by some covering when required; earth up celery as high as you can; plant coleworts still. When carrots and parsnips are fully ripe, take them up, trim off the crowns and fibres, and pack them neatly in layers of sand or charcoal. Dig, trench, and execute all other routine work. Salsify and scorzonera may be similarly treated; but portions of these crops should be left in the ground, for they are perfectly hardy, and are fresher taken up as required.

• Loudon's Sub. Hort.

NOVEMBER.

Stove, Greenhouse, &c.—Water very sparingly the plants on the tan-pit, and give but a subdued heat to plants lately restored to their winter location; renew the air when the weather permits, as the fires occasion an atmosphere in the stovehouse much less pure than that which is inhaled in the conservatory under a natural and very temperate atmosphere: the orchideous plants should not have a higher temperature than 65° until February. The *Camelia Japonica*, China Roses, and various bulbs, should now be brought forward. Keep a moist heat in pits for early productions.

In the vineries and peach-houses, where establishments are complete and compartments sufficiently numerous, the forcing of fruit commences; for vines in fruit keep moderate fires at night if frost sets in, but for the vines which are not to be forced leave the sashes off to let the wood harden.

Flower Garden.—Auriculas will demand much attention, as to changing the upper soil and the gentle removal of decayed leaves; if they are under frames, lift up the sashes behind even in rainy weather, but do not let the rain fall directly upon them. If there be frost, cover up the crowns of delicate herbaceous plants with straw, leaves, or fern, and protect the *necks*, if you can do no more, of shrubby plants: plant bulbous roots. For Hyacinths use a compost of decomposed turf, rotten leaves, dung, sand, and peat, in about equal quantities, very good. Make a bed of this eighteen or twenty inches deep, lay the Hyacinth bulbs on it, nine inches apart every way, and then cover them six or seven inches with the same compost. A compost of the same kind will answer well for most of the bulbs to be planted now; Fritillaries, Narcissuses, and Jonquils, however, do not require so rich nor so finely prepared a mould. The French gardeners frequently plant their Hyacinths in drills deeply

sunk, and filled with the above compost, instead of applying it profusely over beds, and they frequently put down the bulbs with a dibber. Whatever be the ingredients or the proportions of the ingredients used in the composts, they ought to be prepared and blended together a long time before they are used. Take up Dahlias.

Fruit Garden.—Continue the pruning of gooseberry and currant-trees; cut down raspberries and remove suckers; towards the end of the month you may prune apples, pears, &c., also the peach tribe under glass, and likewise those on walls as soon as their leaves have fallen. Where it is an object to have early and fine strawberries, either of the two modes of winter treatment following may be recommended for the purpose:—"Choosing a sheltered place, which however must be open to the south, drive in a line of stakes of convenient height and length, according to the number of plants (in pots or boxes) to be stowed away, and in the direction of east and west. Nail some old boarding to these stakes, and then spread a layer of dry ashes, about three inches thick and $2\frac{1}{2}$ feet in width, on the south side of the boards. On this lay a row of pots on their sides, with their bottoms towards the boards, and their rims parallel with the outside of the layer of ashes. Fill in well between the pots, and also between the bottoms of the pots and boards, with ashes; then proceed with another layer of ashes, and then another row of pots, and so on till you come to the top of your boards, placing each row of pots a little nearer to the boards than the row below it, so that when finished the whole may present a sloping surface to the sun. The whole must then be covered with boards in the form of a coping, of sufficient breadth to protect the lowest row of plants from slanting rains, and with a slight inclination to the back, so as to throw the rain off to the north side. If care be taken that the ashes be quite dry

when put in, frost will have very little effect on the pots. This is a plan very similar to what is used in many places, and one which we find to answer very well.”*

The other method is this, but defective in the important particular of protection overhead:—“Let the ashes be carefully protected from wet until wanted for use. If you plant along the walks of the kitchen garden, open a drill with the hoe or spade, and put in the ashes four or five inches deep; cover lightly with earth, and beat the surface firmly with the spade; dibble in the plants at six inches apart. In other plantations this would be too close, but where there is but one row, with abundant room on each side, they will succeed well, and the edging will be more correct. In quarters where they are planted in beds or drills, they should be at intervals of eighteen inches between the rows, and twelve or fourteen inches apart. The runners should be allowed to take possession of the intermediate space, and the old plants destroyed every second year; but in every case plant if possible in ashes. I have seen a very small garden, edged along the walks with strawberries, by this means produce earlier and better fruit than any other near it, and in quantities that baffled the consuming power of the owner and many of his neighbours.”†

Mulch newly-planted fruit-trees; plant fruit-trees as in last month; cover up pears and apples with straw or fern; preserve a uniform temperature for them, else they will shrivel up.

Kitchen Garden.—Take up asparagus, seakale, and rhubarb for forcing in pots in the forcing-houses, or to be put under hotbed frames, well lined, or cover the crowns of seakale and rhubarb heavily with litter where they stand; late melon pits will answer for this, if the plants be placed thickly together, and as

* Gardeners' Chron., Oct. 19, 1844.

† Kitchen Garden. By Martin Doyle.

near the glass as will allow the shoots to grow to a sufficient height; they will be green or blanched at pleasure, by covering the glass to exclude the light or not, provided that the weather be temperate. You may put them also into a mushroom bed, or make a hotbed for them.* Cut down artichokes closely; clear off the earth from the roots, and lay litter round them, or plenty of leaves if you have nothing better; by the way, collect leaves for composts at this time, but reserve oak and chestnut leaves for pits and hotbeds, for they retain heat before complete decomposition for a long time.

Remove carrots, parsnips, &c., to sheds or cellars where they may be packed in sand, &c., as directed last month. Sow lettuce seeds in new slight hotbeds, and take care of those in the old ones. Plant out cabbages of the early sorts for spring use; earth up those that have well rooted. Sow the early frame pea and mazagan beans. Clear away all dead leaves, haulms, &c., and preserve as much neatness as possible to relieve the gloom of the season.

During this month you should procure Dog-briar Stocks for Roses, and plant them with plum and other stocks for your future grafting and budding.

* Gardeners' Chron.—“In Flanders, where there are choice gardeners, the treatment of asparagus confirms what I have ventured to suggest—that there is no necessity for deep trenching or profuse manure; neither do the Flemings cover with litter for the winter, nor fork or dress the beds in spring. In the intervals however (for they generally grow them in drills) they form a rich and mellow compost of earth and dung, with which, before the frost sets in, they earth up the rows, like celerery, about eighteen inches from the level of the crowns, and, without any further operations, as soon as the buds appear, they cut the shoots nine inches under the surface; by which means, having but just reached the light, the whole shoot is blanched and tender.”—Kitchen Garden. By Martin Doyle.

DECEMBER.

Stove, Greenhouse, &c.—The stove plants which are in their winter slumber ought not to breathe in a higher atmosphere during cold weather than 55°; it must, however, be sufficiently moist to prevent the leaves from flagging. In many parts of our climate, however, the external air is, except in frost, seldom otherwise than foggy, and it is against its influence, and the drying effects of fire inside the houses, that the gardener has to take his precautions. For plants in the conservatory or garden frame, not blossoming, a temperature ten degrees lower is the best in cold weather; it is indeed for them sufficient to exclude frost. Reed matting, &c. will probably be required over all the glass and frames, more or less during this month. If the forcing of peaches and vines is only commencing, you may put strawberries in tan or on shelves in the forcing houses, with successions of flowers to be forwarded into bloom. Prepare for forcing cherries.

Flower Garden.—Fine Stage Carnations, Auriculas, and Polyanthuses, while protected from frost, had better be left in free air day and night in open weather, protected however from rain. Ridge lightly the beds for Ranunculuses, to prepare them for the reception of the plants in February; if you find Pansies thrown out by the frost, replant. In this gloomy season, during short and usually raw damp days, and the absence of sun, the flower-beds present a mournful appearance; alternating frost and rain arrest the progress of vegetation, and leave you little to do in the open garden except some pruning, and the scuffling and cleaning of walks and borders, and the collecting and removing of decayed leaves, &c. with the rake, broom, and wheel-barrow. As to the bulbs in ground, do not leave matting over them except during frost, otherwise they will be prematurely forwarded.

Fruit Garden.—If the weather be not too severe, continue the pruning of pear, apple, plum, and cherry-trees. The pruning of wall trees should be finished, if possible, in the beginning of the month. After pruning gooseberries, currants, and raspberries, the soil should be drawn from the stems to the middle of the space, and there buried; for by so doing the attacks of insects are, in a great measure, prevented. Prune vines. Mulch new-planted fruit-trees. When dressing fruit borders, however, use the fork in preference to the spade, which injures the roots of fruit-trees very seriously.

Kitchen Garden, Shrubbery, &c.—Earth up celerery for the last time, taking care to guard the hearts from frost and rain; by putting litter to the sides, the earth becomes caked and able to resist, in a great degree, the effects of frost and rain. Protect peas and beans during frost and nipping wind with hurdles interlaced with spruce fir leaves, ferns, or straw, and lay reed mats over cauliflowers in all their stages, lettuces, &c.; prepare hotbeds for cucumbers and radishes. Sow the early frame or Bishop's pea; make and paint flower sticks and labels; prepare shreds, wattle hurdles, tie reed straw for mats, arrange seeds, and, in short, keep yourself employed indoors at everything that is requisite in the above way, when the weather prevents out-of-door work. In hard frost you cannot be better employed than in wheeling out manure, and when it departs, you will find plenty to do in digging, ribbing, and trenching.

USEFUL TREES, PLANTS, SEEDS, &c., FOR THE GARDEN.

For the guidance of young gardeners and amateurs who may require to make a selection of fruit trees, plants, seeds, &c., for the garden, the following list of the various sorts of fruits and vegetables that are most in favour at the present time will prove useful.

FRUITS.

APPLES.—Blenheim Orange; Golden Pippin; Nonpareil; Golden Drop (Coe's); Ribston Pippin; Hawthornden; King of the Pippins; Lady Henniker; Lord Suffield; Devonshire Quarrenden; Wellington (excellent for cooking); Norfolk Beefing; White Juneating.

APRICOTS.—Large Early; Moon Park; Breda; Muschmusch; Royal.

CHERRIES.—Bigarreaux; Elton; May Duke; Morello; Kentish; Black-heart; White-heart.

CURRENTS.—Black Grape; Red Grape; White Grape; Monstreuse de Berry.

FIGS.—Black Ischia; Brown Ischia; White Ischia; Black Provence; White Marseilles; Raby Castle.

FILBERTS AND NUTS.—Red Filbert; White Filbert; Kentish Filbert; Bond Nut; Cosford Nut; Dwarf Prolific Nut.

GOOSEBERRIES.—*Red*, Wonderful; Warrington. *Yellow*, Leader; Criterion. *Green*, Stockwell; Rough Green. *White*, King of Trumps; Cossack.

GRAPES.—*Under Glass*, Black Hamburgh; Golden Hamburgh; Muscat. *Open Air*, White Frontignan; Black

Prince; Royal Muscadine; White Sweetwater.

MELONS.—Duke of Edinburgh; Little Heath (Monro's); Tom Thumb; Scarlet Gem; Lord Beaconsfield.

NECTARINES.—Early Newington; Pitmaston Orange; Violet Hâtive; Pine-apple; Victoria; Rivers' Orange.

PEACHES.—Noblesse; Royal George; Dr. Hogg; Victoria; Dagmar; Early York; Late Admirable; Grosse Mignonne.

PEARS.—Autumn Bergamot; Brown Beurré; Chaumontel; Louise Bonne de Jersey; Marie Louise; Easter Beurré; Duchesse d'Angoulême; Glou Morceau; Brockworth Park; Jargonelle; William; Swan's Egg (excellent for cooking).

PLUMS.—Golden Drop (Coe's); Greengage; Prince of Wales; Queen Victoria; Imperatrice; Blue Gage; Early Orleans; Goliath; Red Magnum Bonum.

RASPBERRIES.—Fastolf; Red Antwerp; White Antwerp; Filbasket; Autumn Fruiting.

STRAWBERRIES.—Keen's Seedling; Elton Pine; British Queen; Dr. Hogg; Eleanor (Myatt's); Black Prince; Carolina Superba; Oxonian.

VEGETABLES.

ASPARAGUS.—Battersea, or Giant; Conover's Colossal.

BEANS, BROAD.—Mazagan; Early Monarch; Beck's Green Gem; Johnson's Wonderful.

BEANS, FRENCH DWARF.—Negro; Dwarf Butter; Canadian Wonder, or Flageolet.

BEANS, RUNNERS.—Scarlet; White Dutch; Painted Lady; Champion, or Giant.

BEEF.—Nutting's Dwarf Red; Pine-apple; Dell's Black; Sutton's Dark Red; Spinach Beet, leaves a substitute for Spinach.

BORECOLE, or KALE.—Cottager's; Variegated; Dwarf Green Curled; Chou de Milan.

BROCCOLI.—1st Walcheren; 2nd Snow's Winter White; 3rd Cooling's Matchless; 4th King of the Broccolis; Miller's Dwarf.

BROCCOLI, SPROUTING.—Dancer's Purple.

BRUSSELS SPROUTS.—Mein's Victoria.

CABBAGE.—Cocoa Nut; Enfield Market; Little Pixie; Early Battersea; Rosette Colewort; Large Blood Red, for Pickling.

CARROTS.—Early Scarlet Horn; James's Early; James's Scarlet Intermediate.

CAULIFLOWERS.—Early London; King of the Cauliflowers; Autumn Giant.

CELERY.—Crystal White; Defiance; Williams's Matchless Red.

CUCUMBERS, Frame.—Tender and True; All the Year Round. *Ridge*, Stockwood. *Pickling*, West India Gherkin.

ENDIVE.—Imperial White Batavian; Moss Curled.

MARROWS.—New Custard; Hibberd's Prolific; Large Cream.

LEeks.—Musselburg; London Flag.

LETTUCE, Cos.—All Heart; Black-seeded Bath. *Cabbage*, Tom Thumb; All the Year Round.

ONIONS.—*Spring Sowing*, White Spanish; Brown Globe; James's Keeping; Silver Skin (*for pickling*). *Autumn Sowing*, Lisbon White; Giant Rocca; Tripoli Globe.

PARSNIPS.—Hollow Crowned; Student.

POTATOES.—*Kidney*, Ash Leaf; Prince of Wales, late Rose. *Round*, Early Oxford; Drummond's Prolific; Forty-fold Snowflake.

PEAS.—*Early*, Dillestone's Early; Kentish Invicta; Blue Peter (*dwarf*); Little Gem (*dwarf*). *Medium*, Auvergne; Best of All; Laxton's Prolific. *Late*, British Queen; Veitch's Perfection Marrow.

RADISHES.—Black Spanish; Red and White Turnip; Olive-shaped White; Wood's Early Frame.

SAVOYS.—Drumhead; Dwarf Green Curled; Early Ulm.

SPINACH.—*Summer*, Round-seeded. *Winter*, Prickly-seeded; New Zealand.

TOMATOES.—Earley's Defiance; Greengage; Excelsior; Trophy.

TURNIPS.—Dutch White Early; Snowball; White Stone; Orange Jelly.

RHUBARB.—Mitchell's Royal Albert; Myatt's Victoria; Scarlet Defiance.

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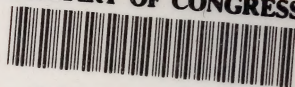
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